FEBRUARY 1918

THE AGRICULTURAL GAZETTE OF CANADA

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THE HOG PRODUCTION CAMPAIGN
SCIENTIFIC RESEARCH IN AGRICULTURE
THE VALUE OF PEDIGREED SEED
BOYS' AND GIRLS' PIG CLUBS
THE WORLD'S LIVE STOCK AND THE WAR

DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette
of Canada

EDITOR: J. B. SPENCER, B.S.A.

Issued by direction of
THE HON. THOS. ALEXANDER CRERAR
Minister of Agriculture

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1918

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OF CANADA

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THE HOG PRODUCTION CAMPAIGN

CO-OPERATION in the campaign for increased hog production has resulted in the facts of the situation being plainly and dispassionately placed before the live stock producers of Canada. Correspondence shows that the urgency of the need is realized, and that there is a serious, business-like desire and intention to meet the situation. A statement as to the conditions in Europe, and the special need for a supply of bacon and pork products, was placed before the Minister of Agriculture and the Live Stock Commissioner by the Food Controller, and, following this discussion, under instruction from the Minister of Agriculture, the Live Stock Commissioner called into conference representatives of the different provinces, including representatives of the provincial Departments of Agriculture. There the Live Stock Commissioner, together with the Food Controller, gave facts and figures showing the responsibility resting upon Canada in making up the necessary food supply as related to meats and fats. Discussion as to ways and means followed, resulting in assurance being given that the whole organization of the various provincial Departments of Agriculture would be utilized to the fullest extent in placing before the people of each province the information secured and brought out in the discussion at these conferences. The time was short, there was no time to lose, and none was lost. The representatives went to work immediately, and systematically, to carry the word direct to practically every farm. The assistance was secured of farmers' organizations, and associations connected with live stock. The support of agricultural and other newspapers was heartily given.

As the Live Stock Branch had become responsible for the work, and it was of a Dominion-wide character, arrangements were authorized that the Live Stock Branch share a portion of the provincial expenses, so that every effectiveness would be assured. A series of display advertisements was also prepared and published throughout Canada in the agricultural papers, and papers having special agricultural pages. These advertisements were afterwards sent out in the form of posters to the branches of all the banks in Canada.

Their support was solicited and recognition must be given to the hearty and unqualifiied response of these institutions. The co-operation of these various bodies gave an exceptionally wide publicity to the movement, and created a sympathetic and anxious desire on the part of those who are in a position to avail themselves of the opportunity to become a part of the larger co-operative organization upon which is dependent the increased supply of food.

It is recognized, however, that the activity of the Live Stock Branch cannot end with its endeavour to increase the exportable supply of pork through a greater production of hogs. At the conferences held, problems and difficulties which are recognized as such were brought out, and they are being given serious consideration. As an example of what is meant, attention is directed to the recent organizations of the Feed Division within the Live Stock Branch. In filling orders it is organized to operate through the provincial Departments of Agriculture. Every endeavour is being made to see that the supply of feed is adequate. Other questions will be dealt with similarly in a practical way, and with every confidence of success, with the assurance of the same assistance and co-operation as has been given in the campaign for increased production.

THE AGRICULTURAL INSTRUCTION ACT

TEACHING OF AGRICULTURE IN THE SCHOOLS OF THE MARITIME PROVINCES

BY J. W. MITCHELL, B.A., ASSISTANT COMMISSIONER FOR THE MARITIME PROVINCES

IN all three of the Maritime Provinces there is a lively appreciation on the part of those responsible for the direction of educational work, and a steadily growing realization by the rank and file of the people, of the importance of the teaching of rural science in the schools, with elementary agriculture as an important phase of the work. This is plainly in evidence in the amount set apart for the work, in each of the provinces, out of THE AGRICULTURAL INSTRUCTION ACT grant. The amounts are as follows:

Nova Scotia	$12,000.00
New Brunswick	11,500.00
Prince Edward Island	$10,500.00

In the foregoing are included the amounts set apart for exhibition and competition purposes.

NOVA SCOTIA

In Nova Scotia the Rural Science work, through arrangement with the Department of Agriculture, is conducted by the Department of Education, with Mr. L. A. DeWolfe, M.A., in charge. He both teaches in the Normal School and directs the work of the schools. During 1917, for the first time, two travelling rural science teachers were employed, and Mr. DeWolfe is so satisfied with the results that he is anxious to see the staff gradually increased until provision is made for a travelling teacher in each of the eighteen counties of the province.

In Nova Scotia home-garden work is stressed to a much greater extent than is school-garden work, that is, the Director pins his faith to it more strongly than to school-garden work. The following data are illustrative of the growth in the teaching of agriculture in the schools:

	1914	*1917*
Home gardens	700	4,176
School gardens	77	200
Schools exhibiting garden produce	71	160

About 200 schools are doing special work in elementary agriculture and exhibition work.

Mr. DeWolfe is strongly of the opinion that much more efficient work could, and would, be done were the school year to correspond to the calendar year, instead of extending from midsummer to midsummer, as is the practice at present. The point would seem to be well taken, as such a change would enable each teacher to complete work begun.

The Agricultural College co-operates with the Normal School in the training of teachers for the teaching of agriculture in the schools.

NEW BRUNSWICK

In New Brunswick the responsibility for the teaching of agriculture in the schools devolves upon the Department of Agriculture. The director in charge of the work, which includes nature study, is Mr. R. P. Steeves, M.A., who works in close co-operation with the Department of Education. He has, at present, one permanent assistant.

In addition to the work amongst the schools, considerable attention is given to the training of teachers in order to fit them for the teaching of nature study subjects and agriculture in the schools.

Teachers' short courses are held at Sussex and Woodstock each year, during the month of January; while rural science schools are conducted at the same points during the summer holidays, when teachers are free to attend and conditions are such as to permit of making the course a practical one. Two courses are given in the Rural Science schools, one for first year and one for second year students.

Bonuses are given to teachers in accordance with their qualifications—the time devoted to nature study work and the teaching of agriculture in the school during the year, and the efficiency of the work done. Also grants are given to schools where they qualify. There are between 1 500 and 1,600 schools in the province, about 100 of which qualified for grants during 1917.

Home-project work, in the form of soil and plant cultivation and close observation of results, is encouraged.

The following data, indicative of the development of the teaching of agriculture in the schools, will prove of interest:

	1914	*1917*
Home gardens	59	1,700
School gardens	19	100
School fairs	...	14

In this province greater importance is, placed, by the director, upon the value of school garden than upon that of home-garden work. Both phases of the work, however, are being steadily developed.

PRINCE EDWARD ISLAND

In this province, Mr. J. E. McLarty, B.S.A., fills the two-fold position of teacher of rural science in Prince of Wales College and director of this class of work in the schools. He is engaged by the Department of Agriculture, but works in close association with the Department of Education, in his field work, and under the Principal of the college in his college work.

There are 476 schools in the province, all of which teach rural science, as it is a compulsory subject upon which a paper is set for the entrance examination.

In connection with the classes at the Prince of Wales College, a potato-growing contest was held in 1917, in which 32 boys competed.

What is termed home-project work—home gardens and the rearing of poultry, calves, and pigs, etc.—has received considerable attention. There were 289 schools in 1915, and 356 in 1916, that carried on this class of work.

The following table, giving the number of school fairs held, is a fair criterion from which to judge of the growth of home-garden work and the teaching of elementary agriculture in the schools of the province:

Year	*School Fairs*
1915	0
1916	4
1917	14

Due, in part, to unfavourable conditions at the schools—lack of ground and lack of fencing—the drift has been decidedly in the direction of home-garden rather than school-garden work. It is quite possible, however, that this will not militate against the progress of the work.

Boys' and Girls' club work is being encouraged as much as possible.

There are eight school inspectors in the province, all of whom act as assistants to Mr. McLarty in promoting rural science work in the schools. The salaries of four of these are paid out of THE AGRICULTURAL INSTRUCTION ACT grant.

CONCLUSION

No attempt has been made, in the foregoing, to deal at all exhaustively with the work done in the different provinces. If I have succeeded in showing that there is a realization of the necessity of changing the curriculum in our rural schools so as to make it include rural science, with elementary agriculture as an important branch; if I have succeeded in indicating that it is a duty, in the framing of a school course, to so shape it as to enable the teacher to take full advantage of environment for the double purpose of education and the laying of a foundation for future life work, and if I have, further, succeeded in showing that an honest effort is being made to grapple with the work in such a way as to make it educational, in a practical way, I have accomplished all that I set out to accomplish.

In all three of the provinces small portions of the grants are used in ways that tend to stimulate an interest in the work, such as grants to teachers, grants to schools, and grants for prizes to competitors at the school fairs.

Greater attention is given, from year to year, to the training of teachers to better fit them for their new duties. This is done through such means as a modification of the normal school course and the holding of summer schools. One difficulty experienced is that many of the teachers so trained are lost to other provinces, particularly the new western provinces. No doubt this resolves itself, quite largely, into a question of the relative salaries paid.

The greater proportion of teachers of our public schools are country born, and in most cases have some practical knowledge of farming. It behooves every teacher, whether holding a Nature Study certificate or not, to prepare now for greater production next year. Your country calls for you to assist. You will inculcate greater unity between school and home if you encourage your pupils and assist them; and your school work will be correspondingly benefitted. You may assist in this work by encouraging your pupils to cultivate any available fertile ground.—*Rural Education Monthly, New Brunswick.*

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS BRANCHES REPRESENTED

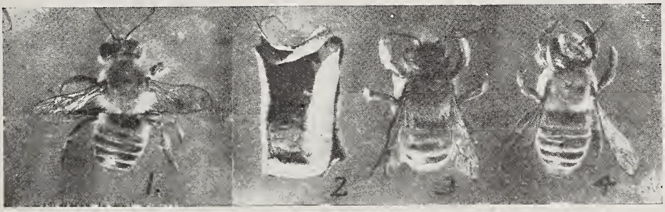
THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF APICULTURE

POLLINATION OF ALFALFA BY BEES OF THE GENUS MEGACHILE

BY F. W. L. SLADEN, DOMINION APIARIST

RECENT research work carried out in the Bee Division, has included a study of the species of bees that trip and, therefore, presumably, pollinate the flowers of alfalfa in the parts of Canada where this plant is, or can be, grown for seed.



1. Female Megashile perihirta CkIl.
2. Nest of M. perihirta.
3. Male of M. Diligens, (latimanus CkIl).
4. Female M. Diligens (latimanus CkII).

All magnified 1½ times.

On July 14th, 17th, and 31st, 1917, at Redcliff, Alta., and Lethbridge, Alta., a species of leaf-cutter bee, *Megachile latimanus* Ckll. was found to be visiting the fields of alfalfa in bloom in considerable numbers, tripping the flowers at an observed average rate of 17 flowers per minute. This species was more numerous in the alfalfa fields than five other species of *Megachile* together, all of which perform the same service. Several species of bumble-bees, fairly plentiful, worked more slowly and often failed to trip the flowers. Honey-bees, also plentiful, visited the flowers without tripping them.

Observations made at Summerland, B.C., and at Keremeos, B.C., on July 20th and 21st gave the same results, except that *Megachile perihirta* Ckll. was the abundant species, *M. latimanus* Ckll. not having been met with in British Columbia.

The two species of *Megachile* mentioned belong to the sub-genus *Xanthosarus* Rob., which is represented in south-eastern Canada by a third species, *Megachile latimanus* Say. *M. perihirta* Ckll. was found nesting gregariously in a nearly new and bare gravel railway embankment at Cochrane, Ont., on August 9th, 1917. A nest of the same species was found in a nearly new gravel road leading to a dwelling house at Invermere, B.C., in July, 1914. There is, therefore, some hope that the species of *Xanthosarus* might be encouraged to breed in the vicinity of alfalfa fields by spreading gravel and making it firm by rolling.

THE DIVISION OF HORTICULTURE

APPLE BREEDING IN CANADA

BY W. T. MACOUN, DOMINION HORTICULTURIST

MOST of the varieties of apples in commerce in Canada today originated in other countries. At the same time, some of the best apples we grow are of Canadian origin; the McIntosh, which has a world-wide reputation, being one of these. The writer believes that within the next fifty years there will be a much larger proportion of varieties of apples of Canadian origin sold by nurserymen.

Much work has been done by a few men in Canada in originating varieties of apples by cross-breeding and hybridization. To the late Chas. Arnold, Paris, Ont., the late P. C. Dempsey, Trenton, Ont., and the late Francis Peabody Sharp, Upper Woodstock, N.B., is due great credit for work done at a time when few were interested in the scientific aspects of fruit growing.

At the Ontario Agricultural College, Guelph, Ont., and at the Horticultural Experimental Station, Vineland, Ont., work in cross-breeding apples has been in progress for some years and, no doubt, some good varieties will be produced at these institutions.

Most of the work in breeding or originating new varieties of apples in Canada has, however, been done at the Central Experimental Farm. Of the varieties originated since 1890, when the work was begun, 115 have been named because they gave promise of being useful in some part of Canada. The greater part of these were obtained by simply sowing the seed of good varieties which had proved hardy at Ottawa, but a few have been the result of hand pollination where both parents are known and every year new cross-bred varieties are fruiting.

In 1898, the writer, believing that in an orchard at the Central Experimental Farm, Ottawa, containing between 400 and 500 named varieties of apples, all sorts of combinations of characters would be taking place by natural pollination, and that the chances of obtaining some good seedlings by sowing seeds from some of these varieties would be very great, had seed saved of some of the best flavoured apples then fruiting in the orchard, as well as some other varieties desirable on account of other characteristics. There were included in these: the McIntosh, St. Lawrence, Fameuse, Wealthy, Shiawassee, Swayzie, Scott Winter, Salome, Lawyer, Gano, Northern Spy, Winter St. Lawrence and Bullock (American Golden Russet). During the past fourteen years, 1,211 of these seedling varieties have fruited, of which detailed descriptions have been made. Of that number 378 are considered so promising that they are being propagated for further test, and 99 of the best have been named.

As there are very few winter apples hardy enough for the colder parts of Canada where the apple is grown successfully, and as there is room for better summer and autumn varieties all over Canada, these new varieties should prove of great value. As this kind of apple breeding had given such good results, seed was saved in 1908 of some more of the best hardy winter apples grown at Ottawa, including Milwaukee, Bethel, Winter Rose, Baxter, La Victoire, Stone and Forest.

The best and apparently the hardiest of 3,000 trees of varieties of Russian origin have been sent to the Prairie Provinces for trial.

CONCLUSIONS REACHED IN REGARD TO ORIGINATING NEW VARIETIES OF APPLES

(1) To produce a hardy apple where no apples have yet been found hardy: (*a*) Cross the apple with the wild Siberian Crab Apple (*Pyrus baccata*); (*b*) Sow seeds of apples which have ripened in a climate as nearly similar as possible.

(2) To produce a hardy long-keeping apple of good quality: Sow seeds of long keeping varieties of apples of good quality which have ripened fruit and proved hardy in a somewhat similar climate, and when possible have both parents long keeping varieties.

(3) To produce an apple having certain characteristics, as regards hardiness, vigour and productiveness of tree, and quality, size, and appearance of fruit. Sow seeds of varieties having most of the characteristics desired.

(4) If seedlings are to be grown on a large scale, more varieties having the characteristics desired will probably be obtained if trees of several named sorts blossoming at the same time be planted in close proximity in the orchard, and the seeds used from fruit borne of these trees. The trees thus planted should combine all the good points in the standard aimed at, for the variety to be originated.

(5) In cross-breeding apples where quality is an important factor, as it should be in most places, cross two varieties which are both good or very good in quality. It has been the experience at Ottawa that in crossing a variety of good quality with one of inferior quality the crosses will nearly always bear fruit with quality inferior to the one with good quality.

DR. SAUNDERS' HYBRIDS

The late Dr. Wm. Saunders, when Director of the Experimental Farms, did some good work in apple breeding for the Prairie Provinces of Canada, and before his death he published the results of his work in Bulletin 68 of the Experimental Farm Series entitled "Progress in the Breeding of Hardy Apples for the Canadian North-West."

After being propagated and thoroughly tested on the prairies, some of Dr. Saunders' hybrids have proved hardier than any other varieties of apples or crab apples tested, thus marking a stage of development in hardy apples for the Prairie Provinces. As none of the fruits resulting from this cross were large enough to compare favourably with less hardy varieties of apples and crab apples, the best of these first crosses were, in 1904, re-crossed with named varieties of apples, with the object of obtaining varieties bearing larger fruits, but which would retain sufficient hardiness to be grown in the open on the prairies. It is not known yet whether these will be sufficiently hardy or not, but this will soon be determined.

As it is important to obtain apples suitable for the Prairie Provinces of Canada as soon as possible, another method than that followed by the late Dr. Saunders is being practised by the writer. Seed was sown in 1910 of some of the hardiest Russian apples, including Transparent, Charlamoff, Beautiful Arcade, Oldenburg, Tetofsky, Anis, Antonovka and Hibernal, and Moscow Pear Apple. More seedlings of these and other varieties have been grown since, and from these about 75,000 were sent as yearlings to the Dominion Experimental Farms in the Prairie Provinces, and planted close together in nursery rows. Some of those which have shown greatest hardiness have been removed to orchards for further test, others are left to fruit in the nursery row. It is planned to continue this work in the hope that from some of these hardy Russians, which stand so much cold in Russia, will be obtained some which will be useful in the cold districts of Canada, where early growth in the spring followed by frost seems as destructive as low temperatures of winter.

THE ENTOMOLOGICAL BRANCH

SOME RESULTS OF SCIENTIFIC RESEARCH ON INSECT PESTS IN CANADA

BY C. GORDON HEWITT, D.Sc., DOMINION ENTOMOLOGIST AND CONSULTING ZOOLOGIST

THE increasing interest on the part of the general public that is being paid to the subject of scientific research in its application to industrial life in Canada should render a statement as to the results of such research as applied to agriculture in its varied forms of timely value at the present time when every effort is being made to promote greater production of foodstuffs by the adoption of more scientific methods in agriculture. It is well for the country that the fact that agriculture is our "basic industry" is becoming less an oratorical expression and more an established axiom. The financial security of the country depends upon the maintenance and advance of our agricultural prosperity, and the latter is absolutely dependent upon the application of the results of scientific agricultural research.

Increased crop production cannot be secured by the mere increase of the total area brought under cultivation. It demands the adoption of more scientific methods of farming and of handling the crops produced. And it is in this connection that the results of scientific research on insect pests find their practical application and value. Crop production cannot be completely successful without crop protection, that is, the protection of the crops from their numerous enemies that tend always to reduce the total amount produced.

The enormous toll exacted by the ravages of insect pests on our field crops in Canada is hardly comprehended except by those who are able to study the question closely over the whole country, and in these days of enormous expenditures, figures are less impressive; but when it is realized that on a conservative estimate based on actual statistics the annual loss caused by insect pests to our field crops in Canada represents, if the money value be expressed in wheat, sufficient wheat to feed the entire population of Canada for one year, the extent of this annual loss will be appreciated more vividly. One of the chief objects of our scientific research on insect pests is to seek means and to take steps to prevent as much of that loss as possible. But our scientific research on insect pests has even wider bearings on the protection of our national wealth. The public is impressed by the devastating results of forest fires and the enormous losses they entail, but the losses that our forests suffer by the depredations of insect pests are less widely known and not generally appreciated, notwithstanding the fact that in certain sections of the country our forests have suffered greater losses on account of insect destruction than through the agency of fire. Forest fires are spectacular; as a rule, insect depredations are not. But insects work insidiously, and their damage is often widespread before it is realized.

The part which insects play in the destruction of human life is now only too well illustrated by the appalling death rate caused by malaria, by typhus, and by plague, all insect-borne diseases. In our own cities, towns and villages, typhoid fever, of which the ubiquitous housefly is one of the chief carriers, takes a toll of human life, especially among children, that we can ill afford to lose and that can be avoided by preventive measures. Likewise our live stock is harassed by and very great losses result from the attacks of insect pests. Our milk and leather supplies are reduced by the presence of warble flies; the working efficiency of our horses is affected by bots and horseflies, and black flies endanger the lives of both cattle and horses. While we have little malaria in Canada, mosquitoes nevertheless prevent agricultural work and the gathering of crops in some regions and the adequate exploration and settlement of others. All these insects are receiving our attention.

It is the object of this article to set forth as briefly as possible some of the more striking results of scientific research that have been brought about by the work of the officers of the Dominion Department of Agriculture. The fighting machine consists of a comparatively small band of trained scientific and enthusiastic workers stationed at laboratories which have been established at ten points in different regions of the Dominion from Nova Scotia to British Columbia and directed from headquarters at Ottawa.

Of the common insect pests attacking field and garden crops few are more widely spread and in the aggregate more injurious than cutworms. A careful study of the life-histories of the different species has enabled us to devise methods of prevention and control that may be adopted either in the small home garden or in the grain fields of the prairies. One example of the manner in which this work is prosecuted may be given. In 1915 the army cutworm appeared in destructive numbers for the first time in Canada in Alberta, where the outbreak covered an area of about 3000 square miles, and caused great apprehension among the grain growers. Our resident field officer immediately investigated the outbreak and discovered means of controlling the spread of the destructive caterpillar, with the result that by means of field demonstrations of the control measures and by press notices extensive damage was prevented.

Locusts or grasshoppers are widespread throughout Canada, and periodically very destructive to field crops. For a number of years a careful study has been made of their habits, with the result that practical control measures through the use of poisoned baits have been devised, and serious losses have been prevented by their application. A most striking instance of the value of these results was afforded three years ago in a region in Quebec, where the continued destruction of crops and grass land by locusts had led to the abandonment of many farms and general discouragement among the farmers. By co-operation among the farmers in the localities affected, over 33,000 acres were treated according to our recommendations with great success and a consequent re-establishment of agriculture in the infested region.

In all the fruit-growing regions of

Canada the orchards are affected, and fruit crops are reduced by the numerous insect pests. Their control, while it increases the cost of production, results in larger crops and higher grade fruit. The results of our investigations on insects affecting fruits have been conspicuously successful in Nova Scotia, where by the demonstration of the control methods based on investigations conducted for several years, the extension of spraying has been very marked with a consequent improvement in the quantity and quality of the fruit. In British Columbia a new fruit pest, the pear thrips, was discovered in 1915. On Vancouver Island certain orchards, which were well cared for in every way, produced little or no fruit; the cause of this failure was unknown until this minute pest was discovered. An investigation was immediately undertaken, and in 1916 the control measures adopted were so successful that in one of the infested orchards which only produced about 700 boxes of fruit in 1915, a crop of (approximately) 7,000 boxes was obtained in 1916.

An important aspect of insect control work which affects the natural resources of the country is the study of forest insects. The extensive areas of forest in Canada lend themselves to widespread depredations by insect pests. Thirty years ago the tamarack throughout eastern Canada from Manitoba to Nova Scotia was largely destroyed by the larch sawfly, which defoliated the trees for several years in succession. A few years ago an important insect parasite of this forest pest was discovered by the writer in England, and the parasite has now been imported and successfully established in Canada with a view to increasing the chances of controlling the pest in the future. During the last decade the spruce forests of eastern Canada have been attacked by the spruce budworm, the effects of which caused great alarm among the lumbermen. But a careful study of its parasites has disclosed the fact that the insect can be controlled by its natural enemies, and thus further apprehension has been removed. The worst enemies of our pine and spruce forest are certain small bark-beetles. In British Columbia these insects have destroyed hundreds of square miles of valuable merchantable timber. By an exhaustive investigation on the life-histories and habits of these beetles it has been possible to devise control methods, by the application of which the further spread of such extensive and serious damage can be prevented.

One of the greatest problems of insect control the world has ever seen was brought about by the accidental introduction into the New England States of two European pests, the gipsy and brown-tail moths, which defoliate orchard, shade and forest trees. They now cover an extensive area in those states, and the brown-tail moth has spread into Nova Scotia and New Brunswick. In the New England States forest and shade trees have been killed over large areas, real estate has depreciated in value on account of their presence, and millions of dollars have been expended in measures to control and prevent the spread of these pests. At the present time nearly a million dollars is being expended annually out of public funds on control measures. The most important of the methods now being carried out to secure control of the two insects is by the use of their insect enemies. From Europe and Asia large quantities of the parasites that keep these insects in check in their native countries have been imported. They have been reared in hundreds of thousands in the parasite laboratory of the United States Department of Agriculture in Massachusetts, and liberated through out the New England States. As the brown-tail moth is fairly-widely spread in New Brunswick and Nova Scotia, where we have been able to keep it under control by continued effort each year, and as the gipsy moth is only about 50 miles from our borders, we commenced four years ago to collect these imported parasites in New England by the courteous permission of the United States Department of Agriculture, and each year considerable quantities have been reared and shipped to Canada. Up to date we have introduced over 100,000 of these insect parasites, and three species would appear to have been successfully established. Our object is to endeavour to establish them as enemies of certain of our native insects, so that as their chief hosts, the browntail and gipsy moths, tend to become more widespread, their natural enemies will be brought to exercise a beneficial control.

This branch of research work in the control of insect pests is now receiving greater attention in our laboratories every year, as it is realised that the control of pests by their natural enemies is destined to play a very important role in the future. Consequently, we are carrying on intensive studies of the agencies which control certain of our widespread pests, such as the tent caterpillars, the spruce budworm, oyster-shell scale, etc., with a view to making use of such controlling agencies wherever it may be found possible. In certain regions we find that some insect pests are prevented from being seriously injurious by the controlling agency of their natural enemies which are, however, absent in other regions where the pests are consequently injurious. To give one example, we have found that in certain sections of eastern Canada the oyster-shell scale is held in check by a species of mite, and we are now endeavouring to introduce this mite in other parts of Canada where it does no occur and where the scale is prolific and injurious. Other instances might be given if space permitted, but it is sufficient to point out that the prevention of insect outbreaks can only be brought about by a thorough understanding of their causes. It is for this reason that we are devoting increased attention to the underlying causes of such outbreaks, in the firm belief that a more complete knowledge of the reasons governing the increase of insect pests and their decrease by natural means will place in our hands the most powerful weapon that we can employ to secure their control. We hope thereby to be in a position to prevent to a greater extent than is now possible by the application of artificial means the losses that we annually experience from their injurious activities.

I am firmly convinced that the Agricultural Representative plan should be applied to the public schools. A travelling rural science teacher for a district including ten or twenty schools could work wonders. Possibly such travelling teachers will some day be engaged by our municipalities.—*L. A. DeWolfe, Director, Rural Science Schools, Truro, N.S.*

THE ALFALFA LOOPER, *Autographa californica* Speyer.

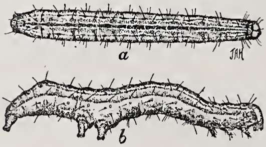
BY ARTHUR GIBSON, CHIEF ASSISTANT ENTOMOLOGIST

THE alfalfa looper is widespread in distribution in western North America. In Canada it occurs in the provinces of British Columbia, Yukon, Alberta and Manitoba. Although we have no actual records of its presence in Saskatchewan, it undoubtedly occurs, also, in that province. In the United States it has been recorded from the states of California, Nevada, Colorado, Oregon, Wyoming, Washington, Idaho, Utah and Montana. It has also been collected in Alaska. In the Journal of the New York Entomological Society, Vol. x., p. 65, Dr. Ottolengui recorded the species from New York state, from a single specimen labelled "Syracuse, New York, 7-10-95." In a recent letter however (Nov. 16, 1917) Dr. Ottolengui states: "This specimen was given to me long ago as registering an extreme eastern occurrence of this species. Whether it is authentic or not, I do not know."

The insect has been known in the United States as a pest of economic importance since 1895.[1] It was not, however, until 1914, that the caterpillars occurred in Canada in numbers sufficient to cause serious injury to crops.

HABITS AND DESCRIPTIONS OF THE INSECT

The Egg.—This has been described[2] as "hemispherical, rounded at the base, the apex with a rounded depression; finely creased vertically; colour pale yellow." We have no information on the length of this stage but it is doubtless similar to that of other closely related species which we have studied and, is, we presume, from about 5 to 7 days. Eggs of *Autographa contexta* Grt. laid at Ottawa on June 14 hatched on June 19, giving an incubation period of 5 days, and ova of *A. precationis* Gn. laid on July 1 produced larvæ on July 7, the egg stage in this instance being 7 days. *A. brassicae* Riley is known to have an incubation period of 6 or 7 days.



THE ALFALFA LOOPER

a, Larva, dorsal aspect; *b*, Same, lateral aspect. Slightly enlarged. (After Hyslop, U.S. Bureau Ent.)

The Larva, or Caterpillar.—The larva when it emerges from the egg is of a creamy white colour with long black hairs.[3] It soon becomes green in colour with pale longitudinal stripes. As it reaches maturity it assumes a darker shade of green. Specimens which we received from British Columbia were described as follows: Length 30 mm., body dark green, cylindrical in shape tapering towards the head; subdorsal line fine and wavy; two other lines in subdorsal space and a wide, whitish, stigmatal band. Tubercles white, setæ white. Spiracles pale, black-rimmed. Thoracic feet black, shiny. Head 2 mm. wide, green with a black patch on either side in some specimens, wholly black in others; hairs on face pale and slender.

As in other larvæ of this genus there are only three pairs of abdominal legs, namely on segments 9, 10 and 13. The larva, therefore, loops when walking, as do the geometrid larvæ.

The feeding habits of the larvæ, in 1914, were similar to other caterpillars which assume a marching habit, largely due to an insufficient supply of food in the areas in which they hatched. In the case of lettuce, whole plants were frequently destroyed, the leaves being entirely eaten, nothing remaining but the stalk and midribs. Alfalfa was stripped of foliage, as were also other plants. In the case of turnips and cabbage, at Kingcome Inlet, B.C., the injury was chiefly to the outer leaves. One correspondent, at Armstrong, B.C., stated that, "the caterpillars travelled and fed when the sun was shining hot, stopping as soon as the heat of the day was over, and on damp cloudy days."

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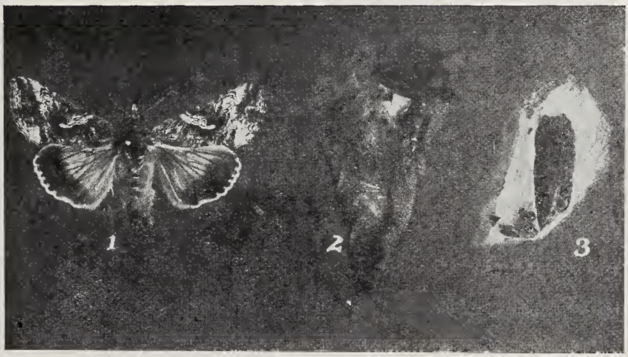
[1] U. S. Bureau of Entomology, Bulletin 95, VII, 109.

[2] Entomologica Americana, VI, 14.

[3] U. S. Bureau Ent., Bulletin 95, VII, 110.

Mr. Ruhmann[4] records that the larvæ, in 1914, commenced to pupate on June 12, their numbers decreasing from about that date. The length of the pupal stage is from about 10 days to two weeks.

The Moth.—With the wings expanded the moth measures from about one and one-half to nearly one and three-quarter inches. It is a beautiful species, the ground colour of the front wings being mostly grayish overlaid with pale and dark brown areas. The transverse lines are shown in the illustration. The gamma-like mark is of a creamy-yellow colour and conspicuous. The hind wings are brown, the outer third being dark brown and appearing as a wide band. All the wings have a metallic lustre.



THE ALFALFA LOOPER
1, Moth; 2, Cocoon in leaf; 3, Cocoon removed from leaf, showing pupa within.
Natural size. (Original)

The Cocoon.—This is merely a thinly-woven web of whitish silk spun among leaves. In some of our specimens the larva had to some extent folded over a leaf which made a further shelter for the pupa.

The Pupa.—Length 18 mm.; width at widest part 6 mm.; blackish-brown in colour; the eyes and tongue-case prominent, the latter extending beyond the wing-cases, which are wrinkled. Spiracles reddish-brown. Cremaster roughened, short and blunt, the hooks firmly attached to the silk of the cocoon.

Observations have, as yet, failed to furnish information on the oviposition habits of the female moths. It is most likely, however, that the eggs are deposited on the foliage of plants as is the case with other species of the genus. The cabbage looper, *Autographa brassicae* Riley, is known to oviposit on the underside of leaves, the eggs being usually deposited singly, or three or four close together.[5]

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[4] Proc. Ent. Soc. Brit. Col., July, 1915, 9.

The moths are active fliers and are attracted freely to lights at night. They have also been noticed flying in the day time. In Montana and Idaho[6] large numbers of the moths were observed, in 1914, around currant, apple and cherry blossoms.

NUMBER OF GENERATIONS

The seasonal history of the alfalfa looper is, as yet, not well known. No one has succeeded in studying the insect throughout the entire year. We have no definite knowledge as to how it passes the winter in western Canada. In the state of Washington it is known to hibernate as a pupa and probably also as a moth.[7] Referring to the occurrence of the moths in the province of Alberta, Dod says,[8] "I have records from May to September. I believe it hibernates here, and is almost certainly a migrant."

It is probable there are two distinct generations each year.

THE OUTBREAK OF 1914

In this year, injury by the insect was confined to the province of British Columbia, serious damage being effected to alfalfa and other crops chiefly in the Okanagan country. Brief references to this outbreak have appeared in the Report of the Dominion Entomologist for the year ending March 31st, 1915, in the Proceedings of the Entomological Society of British Columbia, No. 7, N.S., July, 1915, and in THE AGRICULTURAL GAZETTE OF CANADA, Volume 1, p. 818.

Crops Attacked.—At Westmoreland, B.C., one correspondent reported the complete destruction of a valuable crop of head lettuce. Near Armstrong, B.C., a large army of the caterpillars travelled through a ten acre field of wheat that was just heading out; they did not attack the wheat but the leaves of weeds were devoured and when they reached an orchard which was in clover and alfalfa they ravaged such crops and even climbed young apple trees and stripped them of their foliage. At Lytton, B.C., beans were attacked, one grower reporting that about 25 acres were badly damaged. In the neighborhood of Kingcome Inlet, B.C., the larvæ were present in countless numbers and attacked freely such field crops as clover, turnips, lettuce and other vegetables.

Mr. H. Ruhmann, of the British Columbia Department of Agriculture, reported that at Larkin, B.C., millions of the larvæ were present, but were confined to about 200 acres of alfalfa. Near Vernon, B.C., the insect was present in about 50 acres of orchard land in which clover and alfalfa were growing. At Kelowna, B.C., considerable injury took place in a large market garden, lettuce specially being destroyed.

In addition to the above mentioned crops, namely lettuce, clover, alfalfa, apple (both foliage and fruit), beans and turnips, other plants attacked by the caterpillars in British Columbia, in 1914, are the following: cabbage, peas (both garden ands weet peas), onions, potatoes (to a slight extent), rhododendron, laurel, holly and rose.[9]

Besides, the insect is recorded as having been found feeding, in the United States, on malva, barley, elder, dock, sweet clover, wild lettuce, flax, sugar-beets, corn, carrots, cucumbers, muskmelons, watermelons, squash, currants, gooseberries, raspberries, lamb's-quarters and sunflower.

In 1903, we reared at Ottawa, one adult moth which was found feeding on lupine, on Mt. Arrowsmith, Vancouver Island, B.C., the date of emergence being August 28.

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[5] New York Agricultural Experiment Station, Bulletin 144, p. 40.

[6] Journal Economic Entomology, Volume 8, p. 287.

[7] U. S. Bureau of Entomology, Bulletin 95, VII, 110.

[8] Canadian Entomologist, July, 1905, 250.

[9] The last four kinds are recorded by Treherne: Proc. B.C. Ent. Soc. No. 7, 1915, 37.

NATURAL ENEMIES

In 1914, natural enemies of the alfalfa looper were present in British Columbia to a marked extent. From material received at Ottawa from Armstrong, B.C., Kingcome Inlet, B.C. and West Summerland, B.C., we reared the tachinid fly, *Plagia americana* Van der Wulp, the dates of emergence being June 22 to July 10. This fly had previously been known as a parasite of the alfalfa looper. At Larkin, B.C., another tachinid fly was present, namely *Exorista futilis* O.S.,[10] the species being determined from a specimen sent to us by Mr. Ruhmann. This species has not been previously recorded as a parasite of *Autographa californica.* In addition to these two dipterous parasites a third species, namely, a hymenopterous parasite, was also reared by Mr. Ruhmann, from material collected at Kelowna, B.C. This species proved to be *Microplitis alaskensis* Ashm., which was known to attack the alfalfa looper in the United States. Besides the above species, six other parasites—one tachinid fly, (*Phorocera saundersii* Will.) and five hymenopterous flies, (*Sargaritis websteri* Vier., *Rhogas autographae* Vier., *Microphlitis* sp., *Ameloctonus* sp., *Apanteles hyslopi* Vier.)—have been recorded as enemies of the pest under discussion.

In referring to the natural enemies of the alfalfa looper, Mr. Ruhmann states[11] that he collected 200 larvæ. Of these only eleven reached the pupal stage, the others being killed by a disease or by parasites. Of the eleven pupæ, seven produced tachinid flies, and the other four produced moths. From the 200 larvæ collected, therefore, only four moths were reared. This indicated a very heavy parasitism and from investigations made in the field, such natural checks were evidently widespread. Very few adult moths were captured or observed and the only reference to the second generation in British Columbia, in 1914, is a brief note by the late Mr. Tom Wilson, of the Entomological Branch, who stated, in his monthly manuscript report, under date of July 20, the following: "*Plusia californica* hatching out second brood."

In addition to the above natural enemies, birds were observed to feed readily upon the larvæ.

A bacterial disease was also present among the caterpillars in British Columbia in 1914, being noted particularly in the Vernon and Kelowna districts.

CONTROL

The alfalfa looper represents a type of destructive insect which is liable to increase, unknowingly to the farmer or market gardener, and suddenly appear in countless numbers among certain kinds of growing crops. For this reason it is extremely difficult to anticipate an outbreak and, as has been the case with certain other insects, farmers, in 1914, were unaware of the presence of the alfalfa looper until after important injury had been effected. Like the true army worm, *Cirphis unipuncta* Haw., the marching habits of which it is known to simulate, the alfalfa looper is, fortunately, quickly controlled by natural enemies. Since 1914, we have no records of the insect occurring in destructive numbers.

We had no opportunity to conduct any control experiments with insecticides, owing chiefly to the fact that the injury was largely effected before reports regarding the outbreak were received, and when infestations were investigated the caterpillars were approaching full growth and were being quickly reduced in numbers by natural enemies. At West Summerland, B.C., one correspondent reported that he had experimented with arsenate of lead, hellebore and nicotine-sulphate. Very little good resulted from applications of any of these insecticides. Paris green or arsenate of lead will, of course, destroy the caterpillars if used strong enough, but when a caterpillar is present in such enormous recurring numbers, spraying with an arsenical mixture is a rather hopeless task. A mechanical means of protection would possibly be found to be of advantage, such as the ploughing of furrows or the digging of trenches ahead of the line of march of the caterpillars. These means of protecting crops from the ravages of migrating hordes of caterpillars have been fully discussed in Bulletins Nos. 9 and 13 of the Dominion Entomological Branch.

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[10] Determined by J. D. Tothill.

[11] Proceedings B. C. Ent. Soc., No. 7 N.S., July, 1915.

THE HEALTH OF ANIMALS BRANCH

THE ABATTOIR AND DELICATESSEN

BY M. J. KELLAM, V.S., CALGARY, ALBERTA

At first thought the reader may not grasp the idea of the close relationship existing between the abattoir and delicatessen, but a brief survey of the situation will no doubt be sufficient to establish in the mind of the reader the fact that the abattoir is a very important link in the chain that extends from the producer of food animals to the consumer.

THE RELATIONSHIP

One does not need an acquired taste to relish the high-grade delicatessen that is now being placed on the market by the large packing houses. The demand for such products as cooked ham, roast pork, jellied tongue, veal loaf, etc., has increased enormously during the last few years. No doubt the demand for this class of products depends largely on their agreeable taste and flavour, these qualities appealing to the increasing number of consumers as they become better known. The exacting demands of this ever-widening circle of consumers have acted as a stimulus to the firms engaged in this line of trade, and to-day the production of delicatessen has reached that state where it may well be classed as a fine art.

SANITARINESS A NECESSITY

Let us remember that the finished product can be no better than the raw material from which it comes, and that, from the time of slaughter to the time of it's preparation for the table, meat may undergo a variety of changes. It is a well-known fact that meat will readily absorb taints from an impure atmosphere, and that it soon becomes unfit for food if placed in unsanitary surroundings. We will then realize that care must be exercised, not only in the selection of the various cuts and portions that are to be prepared for this particular line of trade, but, also, in maintaining a high standard of sanitation in the rooms in which the meats are processed or handled. The vats, tables, and utensils used, as well as the hands and clothing of the employees engaged must be kept clean.

INFLUENCE OF SLAUGHTERING METHODS

All meats contain certain preserving qualities that depend on conditions that are in the meat itself, and also on outside influences. To the first belong especially the blood and juice contents of the meat, and the health or disease of the animal before slaughter. If an animal is not well bled at the time of slaughter the keeping qualities of the meat are reduced; while in the case of certain diseases the keeping qualities of the meat are practically destroyed.

The influences of the outside conditions on the meat depend principally on the activity of the various organisms that produce putrefaction. They reach the meat from the air, or from soiling the meat either at the time of slaughter, or at some later period. Meat may become contaminated as a result of careless handling during the act of slaughter, consequently the sanitary condition of the abattoir, as well as the methods employed in slaughtering the animals and dressing the carcasses, are matters of vital importance. Of course, the proper course to pursue is to strive to avoid these sources of trouble. While it is important that slaughtering should be done in a clean place, the dressed carcass should be immediately removed from the abattoir to still cleaner surroundings, and should be promptly chilled.

THE ABATTOIR

But above all other points in sanitation stands the fact that in the abattoir, at the time of slaughter, is the only place where a satisfactory examination of the carcass can be made, for the detection of disease or other conditions that might render it entirely unfit for food. In order to afford protection to the health of the public, every animal should be inspected at the time of slaughter by a competent veterinarian, and the places at which animals are slaughtered and the meat prepared for food, should be maintained in good sanitary condition.

All animals should be slaughtered and dressed, and the carcasses chilled under conditions that will avoid contamination and produce the best results, as the meat of healthy animals, which in itself is suitable for food purposes, may become unfit for food as a result of improper preservation or other treatment. In the case of cured meats the cutting and curing must also be done under good sanitary conditions.

THE MEAT AND CANNED FOODS ACT

The Dominion Department of Agriculture takes a very important part in supervising the slaughter of animals, and the preparation of all products prepared in the large slaughter houses and packing plants in Canada. The Meat and Canned Foods Act, which has now been in operation for several years, is administered by the Department of Agriculture. The provisions of this Act apply to all establishments that are engaged in inter-provincial or export trade.

The principal object of meat inspection, as carried on under this Act, is to protect the consumer from diseased or otherwise unwholesome meat. This involves not only the inspection of the meat for the detection of disease or other unwholesome conditions, but also the requirement of sanitary conditions and equipment in the abattoirs and packing houses, and the enforcement of sanitary methods in the preparation, curing, and handling of the meat.

WORK OF THE INSPECTORS

To meet these requirements a large staff of inspectors is employed. Veterinary inspectors examine all animals before they are allowed to enter the abattoir; they also inspect all carcasses and parts of carcasses at the time of slaughter.

All carcasses, or parts thereof, found on inspection to be diseased, or otherwise unfit for food, are condemned and destroyed for food purposes. Those that are found to be healthy and fit for food are stamped with a design known as the "inspection legend," which consists of a crown, the words "Canada—Approved," and the establishment number. This design also appears on pails, cans, and other receptacles containing meat or meat food products that have been inspected and passed. All meats and meat food products that bear this mark have undergone a careful and thorough inspection at the hands of the officers constituting the Canadian Meat Inspection Service.

SIGNIFICANCE OF THE "INSPECTION LEGEND"

The officers charged with the administration of the Meat and Canned Foods Act have made, and will continue to make, the "inspection legend" stand for something. When this stamp appears upon a product it indicates that the meat was derived from healthy animals, that the animals were killed, and the meat was prepared, under proper sanitary conditions, that no harmful preservative or dye was used in the preparation, and that the name of the product on the label is the true name. Convinced of the soundness of this it cannot be anything but prudence for people to insist that only inspected meats and food products be served on their tables.

THE FRUIT BRANCH

THE TRANSPORTATION OF FRUIT

BY G. E. McINTOSH, IN CHARGE OF FRUIT TRANSPORTATION

THERE are approximately 425,000 acres of fruits in Canada, representing a probable investment of $150,000,000, and providing homes and permanent employment for, say, 25,000 persons. The production from this acreage has increased tremendously in the past eight years, and to-day the fruit industry is one of the largest revenue-producing interests the railways of Canada have. The tonnage handled by the carriers increased from 562,716 tons in 1898 to 1,299,063 tons in 1916, and, when combined with the other products of agriculture, is responsible for one-sixth of the total freight receipts of Canadian railways.

INCREASE OF CONSUMPTION

There has always existed, more or less, a fear lest the increase in production might outrun the increase in consumption, or, to state it differently, that there might be more fruits produced than the people could consume at a price that would pay the producer. Marketing conditions of late years have, however, proven that this condition is not likely to materialize. The consumer is using more fruit than in former years, and in this period of high cost of living and the necessity of utilizing and conserving every line of foodstuffs, the public is using fruit more and more as an article of food rather than as a luxury. Producers, therefore, with proper transportation facilities, and careful marketing methods are almost sure to realize a fair return upon still greater development. The fruit industry of this country is now—to a greater extent than ever before—one of the important industries, and its development becomes a national duty.

IMPORTANCE OF CARE IN TRANSIT

While interest, perhaps, should centre around improved methods and greater production, it is dangerous to sacrifice the method of getting the fruit to the consumer in the best possible condition. No commodity is more likely to deteriorate in transit than the fruit crop, and many diseases that attack the growing fruit continue to develop in transit, thus demanding careful and prompt des-patch, together with proper car accommodation.

The problem before the fruit growers of Canada is, first, to develop a product of quality, then, to create a larger consumer demand, and, finally, to perfect as nearly as possible, the system of efficient economical distribution. This can only be done by a close co-operation with the public carriers. The fruit industry and the railways and express companies of Canada are inter-dependent. Injury to one is injury to both.

MATTERS TO BE CONSIDERED

The successful transportation of fruit is a complex problem, depending as it does on the condition under which it is grown, the care in handling, conditions in transit, and the relation of these factors to the ripening of the fruit and to the development of decay. Losses occur in transporting fruit shipments that are not wholly due to the grower, the handler, or the transportation company, but may be due to causes for which each share the responsibility. The orchard product now requires better handling and better transportation facilities than in the early stages of its development. There has been a great improvement along these lines, but it must be greater in the years to come, as the industry increases and the distribution of the Canadian fruit crop is extended.

DUTIES OF THE TRANSPORT OFFICER

Fruit transportation is now to receive special attention through the Fruit Branch, and the writer, who, for seven years, was transportation officer for the Ontario Fruit Growers' Association, has been selected to take charge. The work as yet is only in the organization stage, but it is intended to make it a valuable addition to the present efficient work carried on through this Branch of the Department of Agriculture.

Briefly defined, the purpose will be to create more co-operation between carrier and producer. Producers and shippers are entitled to many considerations which they probably do not get, but which the railways in many cases would be perfectly willing to concede upon a proper presentation of facts.

To collect and disseminate such information as may be deemed helpful both to the shipper and the carrier through which undeveloped markets may be reached and distribution more properly regulated, to study and put into practice improved methods of distribution, will be the duty of the new officer.

It is difficult, if not impossible, for the average fruit-grower to become thoroughly familiar with classifications, railway or express tariffs and the many changes thereto. Therefore, it is proposed to issue bulletins from time to time acquainting shippers with existing privileges, or tariff changes, during the shipping period.

Finally, we intend to unite our efforts with growers, packers, shippers, carriers, and consumers in one great effort to get fruit and vegetables to the different markets in proper condition, avoiding all possible waste from deterioration in transit.

These and the many other problems arising in connection with fruit transportation will receive attention, and growers and shippers are requested to make known any grievances they may have in this regard.

Matters relating to transportation of fruit and vegetables coming before the Food Controller's Fruit and Vegetable Committee are also dealt with through this Branch, and given the same consideration as matters directly connected with the Fruit Branch.

ATTITUDE OF THE RAILWAY COMPANIES

The railway companies have had extraordinary conditions to meet during the war period, and regulations have at times been made effective that were not in the interests of the shippers of perishable products, causing delay and congestion, particularly in British Columbia. On the whole, however, the service for the fall and winter movement has been better than was expected early in the season. The movement of the Nova Scotia apple crop to points in Quebec, Ontario, and west of the Great Lakes, made necessary because of the British embargo, was additional traffic requiring refrigerator equipment at a time when the demand for such was already taxing the united efforts of the carriers. The shippers and consignees, however, responded to appeals from this Branch and increased the average load to such an extent that, on a conservative estimate, there has been over 500 cars saved in a total movement of less than 2,000 carloads. British Columbia is now nearly cleaned up, and there are not more than 500 carloads yet to be moved from Nova Scotia.

POTATO SHIPMENTS ALSO RECEIVE ATTENTION

The Prince Edward Island potato surplus, which it is proposed to move throughout the winter months, is receiving special attention. The Canadian Government Railway has specially equipped nearly 100 cars on Prince Edward Island, and undertakes to have an adequate supply of standard cars at Port Borden to assure a continuous movement. The Fruit Branch is supplying reliable messengers to accompany these cars from shipping point to the larger distributing centres, Toronto and east thereof. Arrangements are now completed, and this traffic will be moving in the near future.

Several plans for improvement of transportation conditions in soft fruit producing districts of Nova Scotia, Ontario, and British Columbia are under consideration, together with other matters relating to the fruit industry in general, and definite announcement in reference thereto will be made at a later date.

LOWER FREIGHT RATES FOR MANURE

Production and consumption of such products as fruits, potatoes and vegetables, should be extended, not restricted, says the Food Controller. Therefore, their continued increased production and distribution are vital, in view of national and international necessities.

Since we must save for exportation, wheat, meat fats, and sugar, we should utilize more than before the bulkier, more perishable products, and to carry this into effect there must be a greater acreage devoted, especially to vegetables.

Fertilizer in some districts has been hard to get. Fruit and vegetable districts adjacent to Toronto were able to secure manure at a low freight rate, and were, therefore, not compelled to use great quantities of commercial fertilizer, the price of which has increased. Through the efforts of the Transportation Department of the Fruit Branch, Ottawa, Essex district is to share in this advantage, which means a reduction of 6 cents per 100 lb. in the freight rate. Manure from Toronto can now be laid down at Leamington, Kingsville, and other points, for $2.65 per ton, including the freight charges.

THE LIVE STOCK BRANCH

ASSISTANCE EXTENDED TO ASSOCIATIONS IN THE CO-OPERATIVE SALE OF WOOL

BY T. R. ARKELL, B.S.A., CHIEF, SHEEP AND GOAT DIVISION

THE selling of wool co-operatively on a graded basis has shown a most wholesome increase since its inception in 1914. In 1914, 206,129 pounds of wool were graded for societies organized in four provinces, namely, Quebec, Ontario, Manitoba, and Alberta. In 1915 the number of organizations formed for this purpose was increased to nineteen. Approximately 420,000 pounds were classified and offered for co-operative sale. In 1916 this amount had reached the total of 1,721,598 pounds, and every province was represented. This year the total graded was 2,097,909 pounds with a value of $1,321,682.67, as shown in the following statement.

Previous to the shearing season a public warehouse for wool storage was established at Toronto, to which associations could ship in the event they had difficulty in disposing of their clips at point of collection. Southern Alberta and Southern Saskatchewan associations representing approximately 900,000 pounds of wool took advantage of these storage facilities, shipping their wool to Toronto and putting on sale their product at this point. The average price obtaining over Canada for wool sold co-operatively was in the neighbourhood of 63 cents.

UNLOADING WESTERN WOOL AT THE DOMINION GOVERNMENT WOOL WAREHOUSE, TORONTO

WOOL IN SACKS STORED AT THE DOMINION GOVERNMENT WOOL WAREHOUSE, TORONTO
A portion of the consignment from the Saskatchewan Southern Wool Growers' Association

WOOL IN BALES STORED AT THE DOMINION GOVERNMENT WOOL WAREHOUSE, TORONTO
A portion of the consignment of 650,000 lb from the Southern Alberta Wool Growers' Association

STATEMENT OF WOOL GRADED BY THE LIVE STOCK BRANCH AND OFFERED FOR CO-OPERATIVE SALE IN 1917

Name of Association.	Secy. or Manager.	Address.	Number of Members	Amt. of Wool Lb.
Prince Edward Island	L. J. Tennant	Summerside	315	24395½
Nova Scotia—				
Antigonish County	Dr. Hugh McPherson	Antigonish	257	18893
Annapolis Valley	J. L. Pinee	Kentville	15	2232½
Guysboro County	A. B. McDonald	Guysboro	27	1462¾
Inverness County	John R. MacDonald	Port Hood	36	2516
Pictou County	A. F. Fisher	New Glasgow	75	7384
Richmond County	Rev. R. L. McDonald	St. Peters	28	1437¼
New Brunswick—				
Sussex & Westmoreland	M. A. McLeod	Sussex		4058½
Quebec—				
Argenteuil Wool Growers'	J. W. Gall	Lachute	106	14651
Beauharnois	R. E. Husk	Huntingdon	113	11743
Bedford	W. R. Beach	Cowansville	150	18402
Beauce				11025
Compton	H. A. Taylor	Cookshire	281	34514
Megantic	E. Bolduc	Leeds Village	49	8102
Pontiac	C. H. Hodge	Shawville	485	45887
Richmond	L. V. Parent	Richmond	172	34148
Sherbrooke	W. J. McDougall	Lennoxville	135	20235
Stanstead	E. E. Temple	Ayr's Cliff	125	19548
Ontario—				
Ottawa				3082½
Ontario Sheep Breeders'	R. W. Wade	Toronto		318212
Manitoulin	W. Hilliard	Kagawong		24321
Manitoba—				
Elkhorn Wool Growers'	H. J. Jones	Elkhorn	8	2252
Dept. of Agriculture	J. H. Evans	Winnipeg	459	167978
Saskatchewan—				
Southern Sask. Wool Growers'	C. S. Herringer	Maple Creek	41	165443
Alberta—				
Alberta Sheep Breeders' (Calgary)	E. L. Richardson	Calgary	280	151497
Alberta Provincial Sheep Breeders' Assn. (Edmonton)	W. J. Stark	Edmonton	165	63490
Central Alberta Wool Growers'	A. J. Cameron	Lacombe	98	45540
Pincher District Wool Growers'	J. W. Harwood	Pincher Creek	45	61277
Southern Alta. Wool Growers' Assn	F. Colpman	Lethbridge	61	714303
Vermilion Wool Growers'	Job Mace	Vermilion	32	37879
Walsh-Irving Wool Growers'	Chas. Beattie	Walsh	2	52334
British Columbia—				
Interior of B. C. Wool Growers' Association	C. E. Lawrence	Kamloops	14	9666
Total				2,097,909

THE SEED BRANCH

SEED TESTING

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

DURING the year ending August 31st last, 12,431 samples of seed were received at the Ottawa seed laboratory for test from farmers, seed merchants, and institutions. Nearly 70 per cent of these samples were sent by seed merchants and about 25 per cent by farmers. At the Calgary laboratory during the same period 13,547 samples were received. Of these 85 per cent were from farmers and largely represented lots of oats and wheat for germination test.

During the first four months of the present laboratory year, from September 1st to December 31st, the Ottawa laboratory has received 3,740 samples. Of these 192 were from farmers, 2,276 from seed merchants and 1,272 from institutions, including experimental farms. From this it will be seen that farmers are not taking full advantage of the laboratory to have their seed tested before offering for sale. Comparatively few samples are received from the Maritime Provinces. Of the number stated, 163 were from Quebec, 1,554 from Ontario, and 539 from the United States. Most of the samples were for only either purity or germination test, but 200 were for both. The purity test asked for numbered 2,063, and the germination 1,677. Of the samples of timothy, red clover, alsike, and alfalfa seed for grading, 389 were No. 1, 954 No. 2, 408 No. 3, and 290 rejected, or prohibited, from sale under the Seed Control Act. This shows a considerably larger proportion of samples coming within the higher grades than in some years.

As germination tests require from ten to twenty-eight days, it is impossible to give results promptly on samples received during a stated period. In the four months ending December 31st, 957 germination tests were reported. The results showed 571 samples to be up to, or above, the standard percentage of vitality for good seed, 324 between standard, and two-thirds of standard, and 62 below two-thirds of standard.

The word production now rivets our attention. It suggests thought with power, intelligence and organization. It represents not a spontaneous quantity only, in a ragged slipshod fashion, but, when coupled with conservation, it implies enterprise, expansion, development, co-operation, thrift, progress, prosperity. It suggests the occupations of more than 75 per cent of the people, the great problems of distribution, of transportation, of the accumulation of real wealth, of vast enterprises of world democracy, and it demands education of the most direct and substantial character.—*R. P. Steeves, Director, New Brunswick Elementary Agricultural Education, in Rural Education Monthly for January.*

PART II

Provincial Departments of Agriculture

INCREASED HOG PRODUCTION

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

THE seriousness of the feed situation made it impossible for us to do as much in connection with the "Increased Pork Production Campaign" as we might otherwise have done. Provincial crop returns for the year indicate that our grain crop will not be much over a 75 per cent crop, which means that practically every extra hog kept will have to be fed on imported feeds, the high price of which is common knowledge.

Our policy consisted of:—

1. An article issued to the press of Nova Scotia early in November entitled "Hogs as Valuable as Shells."

2. An advertisement headed "Keep a Pig" which appeared in every local paper in the province of Nova Scotia, and along with that a reader entitled "Moderate Estimate of the Profits from Keeping a Brood Sow this Winter."

Also advantage was taken of the annual meetings of some 275 agricultural societies in the province to whom a letter signed by John M. Trueman was sent. This letter outlined the conditions and urged the saving of sows, and also contained a statement to the effect that the College at Truro would act as a medium of exchange and distribution.

How many sows were actually saved by this propaganda we have no notion, but Mr. Trueman has received to date 137 inquiries for sows, and was able to reply to practically all the parties inquiring and advise them where they could get sows offered for sale. It was anticipated, however, that the great majority would effect purchases and sales locally and, therefore, we did not expect to hear from them. The correspondence, however, received indicates that a very considerable conservation of the sows of the province occurred as the result of the campaign—just how many we cannot easily ascertain.

The Government only owns two institutions at which pigs can be kept; at one of these, the college at Truro, we increased our holdings of brood sows from 14 kept last year to 22 kept this year.

Our Provincial Health officer, Dr. W. H. Hattie, of Halifax, corresponded with every county institution in the province asking for information as to how many extra sows were kept in these institutions due to the campaign. From the answers received we learn that the brood sows kept at these institutions have increased from fifty to seventy-five per cent.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

UPON my return from the Hog Production Campaign held in Ottawa in November, we called in representatives of all the municipal councils. These bodies are made up of two men from every parish and are the only organizations that really touch every part of the province. We discussed the matter of swine production thoroughly at this meeting. Some were favourable, but owing to the difficulty of securing supplies of feed they advised that it was impossible to do anything, the grain crop for 1917 being poor. Shortly after we consulted men in every part of the province, who were closely in touch with the live stock and feed situation, and, with the exception of one case, we were advised against a campaign. However, immediately we received word from Ottawa that feed was available, we circularized every newspaper and every agricultural society (secretary and president), and previous to that we had our district men at work. If the agricultural societies take the matter up with energy, we expect to have to go to Montreal to buy breeding sows. In some counties quite large numbers of sows have been kept, which otherwise would have gone to the market this winter, as a result of the personal work done by our county men. I do not expect a large increase in hogs next spring in this province, simply because the feed question held us up so long, and, until that was cleaned up, we were working under a great handicap. Now that through the combined agency of the Live Stock Commissioner and Food Controller, mill feeds are being made available, we expect to secure a fairly good response in pork products in 1918.

QUEBEC

BY J. A GRENIER, DEPUTY MINISTER OF AGRICULTURE

A campaign for an increased production of pork, wheat, beans and peas in the province of Quebec was launched on the 29th of November. A meeting had been called for the purpose, at the Quebec Government building, of our nineteen District Representatives, all the regular lecturers and instructors, some forty farmers, a representative from each of the three agricultural colleges, and some members of the clergy. The Dominion Department of Agriculture was represented by Professor Day. The meeting lasted a day and a half and was divided in three sessions: the first on pork production; the second on wheat and the third on peas and beans.

After explaining the food situation in the allied countries, it was shown that the country and the province had reason to expect the following from the farmers: (1) an increase from 20 to 25 per cent in the number of hogs; (2) an increase in the production of wheat from 4,000,000 bushels, the crop of 1917, to 12,000,000 bushels, the quantity required to feed the population of the province of Quebec; (3) an increase in the production of beans and peas.

All present pledged themselves to urge upon the farmers the necessity of increasing the production of these food products on this scale.

Arrangements were made to cover the province in the shortest possible time, the territory being divided into 35 districts for this purpose. Two lecturers were stationed in each district and instructed to visit all the parishes. One of these is a District Representative or an instructor; the other one, a practical farmer. So that we have, at the present time, over 70 lecturers, who are urging the farmers to produce more, giving the reasons for this request and showing them practical ways and means to achieve their object. The English districts were put in charge of the professors of Macdonald College and some English farmers. It is hoped that all the parishes will be visited by the end of January.

The Minister also appealed to the priests and clergymen, asking them, by circular-letter, to lend their co-operation. Other letters will be forwarded to the mayors, teachers, bank managers, and postmasters. A large distribution of circulars, posters and pamphlets, bearing on the main issue of the campaign, will also be made.

Our efforts have so far been met with much enthusiasm and there is no doubt that they will be fruitful, if the farmers do not experience too great difficulty in securing fertilizers, corn and seed grain, at reasonable prices.

In order to encourage the production of pork, the Provincial Government has purchased over 400 sows, which will be wintered at Macdonald College, Ste-Anne-de-la-Pocatière agricultural school, Cap Rouge, Lennoxville, and Ste-Anne-de-la-Pocatière experimental station, and at the Levis quarantine with the co-operation of Mr. J. H. Grisdale, Director of the Dominion Experimental Farms, and of Dr. F. Torrance, Veterinary Director General of the Dominion Government. These sows will be served at the earliest moment and sold next spring by private sale or auction.

SASKATCHEWAN

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

ALMOST immediately after the return of our representatives from the Pork Production Conference in Ottawa, we undertook to acquaint the public regarding the serious need for more bacon. District conventions of the Grain Growers' Association at each point explained the situation and urged the hearty support and co-operation of their members. The Saskatchewan Co-operative Elevator Company held its annual meeting about the same time, and Hon. Geo. W. Brown outlined the situation to their 350 delegates from all parts of the province. The Saskatchewan legislature being in session at the time adopted the resolution given in THE AGRICULTURAL GAZETTE for December, page 1071.

Hon. W. R. Motherwell, on behalf of the Government, outlined the plan for distributing sows in districts where the local supply was insufficient. It was proposed that the Government should buy sows in carloads, assemble them at convenient centres in the province, and fill the farmers' orders as received. It was announced that when desired sows would be bred before being shipped. In order to further the campaign two conferences were held—at Regina and Saskatoon—and to these reeves and secretaries of rural municipalities and presidents and secretaries of agricultural societies were invited. Their cordial support of the plan was announced and much organization work is being done. At each conference the following resolution was adopted:—

> "Whereas it has been clearly demonstrated that the herds and flocks of meat-producing animals in all countries of the world have enormously decreased in the last three years; and

"Whereas, a serious shortage exists in the supply of pork products for our armies in the field, and for the civilian population, especially the women and children behind the lines in France;

"Therefore, be it resolved, that we, the delegates to this conference, do our utmost in our respective localities to promote in every way possible the Hog Production Campaign which has been inaugurated by the Department of Agriculture."

The Government farms at Regina, Moosomin, North Battleford and Prince Albert will be able to supply a large number of weanling pigs next spring, and it is expected that not only boys' and girls' clubs, but farmers as well, will purchase largely from this source of supply. The University Farm, operated by the College of Agriculture, has always kept a large number of brood sows, and has sold the over-supply for breeding purposes. Their efforts in this respect will be maintained. It is hoped also that there will be a substantial demand from urban communities.

Every urban municipality in the province has received a letter asking for amendment of municipal by-laws where necessary to enable residents of urban municipalities to keep hogs. A considerable number have signified their willingness to make the necessary amendments.

ALBERTA

BY J. McCAIG, B.A., EDITOR OF AGRICULTURAL PUBLICATIONS

THE authorities and the people of Alberta are giving united assistance to the hog production campaign. Such presentation of the condition of the allies with respect to the scarcity of meat has been made that no one is holding back for guarantee of fixed prices for pork for either a short or long time. This bump has been got over, and the feeling is universal among producers that an increase in hogs is a plain necessity and duty.

WORKING WITH THE FOOD CONTROLLER

A delegation, consisting of H. A. Craig, Deputy Minister of Agriculture; W. F. Stevens, Live Stock Commissioner; E. L. Richardson, Manager of the Calgary Exhibition; W. J. Stark, Manager of the Edmonton Exhibition; Secretary Woodbridge and P. Baker of the United Farmers' Association, and G. H. Hutton and W. H. Fairfield of the Experimental Farm, attended a conference with the Food Controller in November and are back to carry on the campaign. The Minister of Agriculture called meetings at Edmonton and Calgary, to which the secretaries of the agricultural societies, prominent breeders, and others were invited, and the need of the time was set out and the steps necessary to secure greater production discussed. The secretaries of the agricultural societies will institute a canvass among members to ascertain the chances of increase as well as to encourage it.

The Department of Agriculture is co-operating with the Federal Live Stock Branch in making increased feed available. Already several cars of "A" screenings have been sold by the Seed Branch. It is expected that one hundred cars will be used in the province.

DISTRIBUTION OF BREEDING SOWS

W.F. Stevens, provincial Live Stock Commissioner, is directing the work chiefly. In addition to the meetings held at the larger centres, he, along with President Wood of the United Farmers' Association, has held meetings in the chief pork producing districts of the province, particularly in Central Alberta, and has met with encouraging success. He is also carrying out the work of the Department of Agriculture in the distribution of sows. An agent of the Department purchases thin, fairly well-grown sows at the packing plants to be bred and sold to farmers at cost. About two hundred were purchased in the first two weeks of the campaign, and the number will be much greater later on. Reports from agricultural societies show that from ten to twenty-five additional sows will be required in most places. Grande Prairie will use from fifty to one hundred, and Waterhole, also in the Peace River country, is speaking for a car. The sows are bred to Berkshire, Yorkshire, Duroc, and Hampshire boars. One dollar is charged for service and the sows redistributed at the ruling price per hundredweight on the date sold. H. H. McIntyre, District Agent from Stony Plain, is in charge of the distribution at the exhibition grounds in Edmonton. A representative has been placed at Calgary also.

The town of Lacombe has had a campaign of its own. The local regulations forbidding the keeping of pigs have been suspended and many of the residents are now keeping a pig or two.

WINTER AND SUMMER FEEDING

The provincial press is being used to give the greatest publicity to the work, the matter furnished relating to all phases of the question, such as the conditions as to meat supplies in allied countries, the farm conditions favourable to pig-keeping and the best methods of winter and summer feeding. For winter keep, the main reliance of the farmer is whole oats fed outside on the ground in order to give the sows exercise. A small allowance of roots is desirable where they are grown, and there should be available also a mixture in the proportions of one ton of coal slack, ten pounds of salt and one pound of sulphur.

The problem of summer feeding is rather troublesome in parts of Alberta on account of the difficulty of securing good catches of tame grasses and clovers where range grasses are turned over. For summer feeding the Commissioner recommends the early sowing of a combination of one-half bushel of oats, one-half bushel of beardless barley, and one bushel of winter wheat. The winter wheat stools well, forms a good mat that remains succulent all summer. It is better than spring grains in this respect, but the mixture furnishes grass and grain feeding throughout the season. Rape is a good supplement to this pasture. It may be grazed on loose sandy land, but should be cut on sticky clay land.

The Department of Agriculture is increasing the breeding stock on all of the Demonstration Farms to the extent of doubling the number. Generally about four or five sows are kept, but the number is now eight or ten on the eight demonstration farms.

BRITISH COLUMBIA

BY WM. E. SCOTT, DEPUTY MINISTER OF AGRICULTURE

WE are alive to the necessity for using every effort towards increasing the production of hogs as an essential food for Great Britain and her allies, and are carrying on an educative campaign during the winter months, in order to induce as many farmers as possible to increase the number of hogs kept by them.

We are in communication with the Live Stock Branch of the Federal Government, under whose direction this campaign is being carried out throughout Canada, on the subject of reducing the price to farmers of bran, shorts, corn, etc., by a system of Governmental distribution of these necessary feeds. We have not as yet been able to adjust the matter in a completely satisfactory manner, but I hope before long arrangements will be made whereby these feeds will be acquired in bulk by the Live Stock Branch of the Federal Government and sold to the provincial Governments at cost price, to be distributed by them to farmers also at cost price.

The crux of the whole situation appears to me to be cheaper food stuffs for hogs, and any action along these lines which will result in materially reducing the present high prices that our farmers have to pay for mill feeds will result in a large increase in production.

Our Department does not intend to breed any brood sows and keep them on Government farms for distribution to farmers. We consider that, as things are at present, there should be no difficulty in farmers securing themselves any extra brood sows that they want. Every day hundreds of good sows ranging from 100 to 200 pounds in weight are being shipped to butchers.

We contemplate putting several good practical men with a thorough knowledge of the most successful methods of hog raising in the field. These men will visit the farmer on his place and tell him of the present situation as regards the world's supply of hogs, and the necessity of every effort being used by farmers to do their share to help in this world crisis by increasing the supply of fats which are so scarce at the present time, and so essential for maintaining human vitality; to advise him as to the correct methods of raising stock, to show him how he may feed them most economically, and, generally, to persuade him to keep one more brood sow and to raise one more litter for the sake of the Empire. We consider that work of this nature on the farm will secure better and more permanent results than evening lectures.

As soon as we have definite information to give the farmers as to the price he will have to pay for bran, shorts, corn, etc., through the system of distribution to the farmer arranged for by the federal and provincial Governments our men will start on their field work.

An educative campaign through the medium of the press, our *Agricultural Journal*, and circular letters to secretaries of Farmers' and Women's Institutes, and Government agents, has already been carried out and will be maintained.

We are endeavouring to get all civic and rural municipalities to amend their by-laws, whereby hogs can be kept within the confines of the cities or municipalities, under, of course, proper sanitary conditions.

Not a few of our best teachers have learned to correlate the garden work and nature work with their regular school subjects. Such teachers often say, "Rural Science is not on my time-table; but, under various headings, I teach it every day."—*L. A. DeWolfe, Director, Rural Science Schools, Nova Scotia.*

SCIENTIFIC RESEARCH IN AGRICULTURE

NOVA SCOTIA

BY L. C. HARLOW, B.SC., B.S.A., CHEMIST, COLLEGE OF AGRICULTURE

THE Department of Chemistry realizes that the soil must, at the present time, be depended upon to PRODUCE! PRODUCE!! PRODUCE!!!—that it should assist in every way possible in the call for increased production.

The study of typical soil areas, in order to get some idea of the latent plant food, continues to be one of our lines of work. The thoughtful farmer should be encouraged by knowing that his soil has a good supply of locked-up potash awaiting the application of the chemical principles for setting it free. After last year's work, we again emphasize the need of phosphoric acid, organic matter and nitrogen. During the past season the soils of parts of Inverness, Hants, Lunenburg and Queen's counties have been studied.

Our second line of work is to investigate local sources of materials which may be added to increase the productive power of the soil. To this end many rocks, mud, swamp deposits, fish waste and fertilizers have been analyzed.

After two years of field work, we are quite convinced that for increased soil fertility, the material most available in this province is limestone. Many farmers report increases of from one half to one ton of hay per acre, better clover and turnips, from the use of ground limestone.

Results of pot experiments with various grades of basic slag, and free sulphur with various fertilizers, are as yet incomplete.

QUEBEC

SOME OUTSTANDING FEATURES OF THE WORK AT MACDONALD COLLEGE

IN several branches of scientific research, the work carried on at Macdonald College in 1917 has resulted in facts being ascertained that are of much importance to agriculture, particularly in the province of Quebec. Research work at the Macdonald College is assisted financially from the grant made to the province under THE AGRICULTURAL INSTRUCTION ACT. The application of the knowledge obtained from these investigations will tend to increase farm yields and profits at a time when greater production is so essential to the successful prosecution of the war.

ANIMAL HUSBANDRY

In the animal husbandry department some results of special interest were obtained during the past year. The self-feeder for swine was introduced and an experiment on the "cafeteria" plan proved suggestive for further work. The hogs fed with the self-feeder were allowed four kinds of meal—shorts, ground corn, tankage, ground oats and barley mixed. These were placed in separate compartments in the feeder, and water was supplied in the regular troughs. The pigs that had access to the feeder made an average daily gain of 1.2 lb., and for each pound of gain 4.66 lb. of meal were required. Those fed on the same feeds by hand three times a day averaged 1.0 lb. gain per day and required 4.99 lb. of meal per pound of gain.

Other lots of hogs were allowed different amounts of exercise during development from weaning time. The hogs that were closely confined required more care to keep them clean, but led all others in rate and economy of gain, as the following results show:—

Close confinement.—1.1 lb. average daily gain, requiring 3.44 lb. of meal per pound gain.

Limited exercise.—.95 lb. average daily gain, requiring 3.70 lb. of meal per pound gain.

Large paddock.—.92 lb. average daily gain, requiring 3.96 lb. of meal per pound gain.

The dressing percentages of the different lots were in the reverse order, ranging from 74.4 for large paddock lot to 71.7 for close confinement lot.

Records of the feed cost of raising calves and developing heifers have been kept. The following table affords a comparison between calves dropped in the fall and those dropped in the spring:—

No. of Animals.	Average cost of 1st 6 mos.	Average cost of 2nd 6 mos.	Average cost of 1st year.	Average cost of 2nd year	Average cost for 2 years.
10 spring calves	17.53	9.72	27.25	15.27	42.52
10 fall calves	16.70	6.01	22.72	15.66	38.38
Average	17.11	7.86	24.98	15.46	40.45
Difference	.83	3.70	4.53	.39	4.14
Record of 10 heifers now in milk	18 19	8.47	26.66	13 97	40 63
62 head	17.32	8.11	25 43	.....	....
36 head	....	.....	....	14.73	.....

It will be seen that the fall calves cost less money, largely because of the fact that after the first six months the extra time on grass is possible with fall calves. The first six months is the most expensive period, because higher-priced feeds, including skim milk, have to be employed. Skim milk is indispensable for good results, but, nevertheless, runs into money at 20 cents per hundredweight. The total cost until 2 years of age for feed alone is $40.45. An extra six months before calving brings it up to $48.46. When other charges are included, it will be obvious that, even with the cheapest feeds available, a heifer that is fully developed must be worth at least $75.00 at calving time to square her account.

SHEEP INVESTIGATIONS

Returns from the demonstration sheep flocks show an increased cost of maintenance, the average total cost per breeding ewe being $3.97 per year. The commercial returns per ewe averaged $10.70, the fleece value amounting to $2.40 of this, and the net profit per ewe being $6.73.

CEREAL HUSBANDRY

Many of the cultural experiments have given results of value, indicating weaknesses in methods commonly practised and pointing the way to increased yields by a change of method. This may be illustrated by a study of the figures given below, showing the advantage to be gained by early seeding of small grains. The yields reported are the average of six years' experiments. In each year the first seeding was made as soon as the land was in good condition for seeding. The other seedings followed at intervals of one week; the second seeding being one week later than the first; the third, one week later than the second; and so on.

EFFECT OF DATE OF SEEDING ON YIELDS OF SMALL GRAINS

Seeding.	Oats Early Triumph Yield per acre	Wheat Red Fife Yield per acre	Barley Mandscheuri Yield per acre.
	Bus.	Bus.	Bus.
First	73.16	35.83	60.78
Second	64.95	29.10	61.06
Third	59.98	28.47	56.81
Fourth	58.45	24.79	54.46
Fifth	53.13	18.78	55.49

The decrease in yield with the later seeding is most marked with oats, but there is also a decided falling off in the yield of wheat. The figures show that it is not so necessary to hurry the seeding of barley to secure maximum yields, so that the seeding of this crop may to advantage be delayed until the other cereals are sown. The yields all indicate how important it is that as much work as possible be done toward preparing land in the fall, and how essential is good drainage to permit early work and early seeding in the spring.

RESULTS WITH CORN

Corn continues to receive close attention. Trial varieties have been limited to those commonly grown in South-western Ontario, so that good seed may be obtained in quantity each year. To compare with these several of the large late varieties such as the Red Cob and Mastodon have been grown. The experiments have clearly shown that the late maturing varieties, while they produce a high tonnage of green fodder, frequently contain a much higher percentage of water than the earlier sorts at cutting time, so that their dry weight is actually less than many of the smaller growing sorts. This may be illustrated by comparing the green and dry weights of Red Cob and several smaller varieties. These yields are for the year 1915:—

Variety	Green Weight Tons	Dry Weight Tons
Red Cob	21.651	2.801
Barley	14.075	3.468
Goden Glow	15.216	3.843
Wisconsin No.	14.962	3.494
Longfellow	14.836	3.991
North Dakota	13.821	3.873

If the green weights only were considered, Red Cob would, of the above named varieties, be considered the most profitable, but since the value depends more on the percentage of dry matter this variety in actual food value is at the end instead of the head of the list. In growing corn it is, therefore, important to select varieties that will give a comparatively high percentage of dry weight, or, in other words, those which will approach maturity by cutting time.

In those sections of Quebec that have the longest growing season such varieties as Wisconsin No. 7, Bailey, Golden Glow, White Cap and Compton's Early, have all proven satisfactory. In shorter season districts, Longfellow, Golden Glow, North Dakota and King Philip have all done well, while for the very late districts such varieties as North-western Dent and Quebec Yellow would be more suitable.

In methods and rates of planting exhaustive experiments have been carried on for a number of years. The results seem to warrant the conclusion that moderately thin planting—rows three and a half feet apart and the plants eight to ten inches apart in the row—will give a better crop than either very thick or very thin planting. If the planting is in hills three and a half feet apart, three to five plants per hill is a sufficiently heavy stand to insure maximum yields.

ALFALFA EXPERIMENTAL WORK

The work with alfalfa has been continued and extended. On the college grounds upwards of one hundred different varieties and strains from all parts of the world have been tested for hardiness and yield. Less than half a dozen have proven suitable for growing in the climate of Quebec, many of the others killing out completely and most of them over fifty per cent. For ten successive years, however, Grimm alfalfa has wintered with little perceptible loss, and we now have several pieces that we are cutting for the fifth season. This variety has repeatedly shown itself to be hardier than either common red clover or alsike, as it has come safely through several winters that were fatal to the clovers.

Our experience with alfalfa at many points in the province during the last five years has led to the conclusion that Grimm alfalfa will succeed and produce profitable crops where the proper precautions are taken. It is essential to success, first, that the variety be hardy; second, that the land be given a dressing of lime; third, that it be free from grass and perennial weeds, and, finally, that it be well drained, either naturally or with tile. A circular on the growing of alfalfa in Quebec has been prepared in the cereal department and may be obtained on application.

ROOT CROP INVESTIGATION

Root crops, in view of their particular adaptability to the climate of this province, and the all too general lack of appreciation of their value, have continued to receive close attention. To secure the greatest possible economy in production is the ultimate object of the work with these crops. The cost per acre being high at best, it is essential for economical production to obtain heavy yields. The factors that influence the yield have, therefore, been the subject of investigation. This has resolved itself into a study: First, of classes of root crops; secondly, types within the classes; and, thirdly, varieties within the types. From the best varieties an effort has been made, fairly successfully, to isolate the superior strains; taking into consideration not only production of dry matter per acre but also seed-producing ability.

Mangels, swedes (ruta bagas), carrots, turnips, sugar mangels, and sugar beets are being studied. In these tests attention is given to yield of roots, per cent of dry matter and uniformity as to type, colour and quality. The results show that under the conditions existing here, the mangels and carrots give considerably higher returns than do the swedes and the turnips. On account of the expense of production, particularly in connection with harvesting, carrots can be produced profitably only on limited areas for special purposes. The low yield of turnips combined with poor keeping qualities will naturally limit the production of this crop. Being easily produced and rapid in development, turnips will be found valuable for autumn feeding. Mangels and swedes remain as the most important root crops.

Through the province generally swedes are grown more extensively than are mangels and in some cases rightly so. In many sections, however, mangels should replace swedes as they would give considerably heavier yields. Where the land is in a good cultural condition, fairly deep, and well drained, mangels are to be recommended. On the other hand swedes are superior on soil in ordinary or poor condition and on land that is poorly drained. In the tests here, covering a period of five years, mangels have given over eleven per cent greater yield than swedes.

In the experiments with types, the results indicate that in mangels the Intermediate is superior to the others. Here belong the Yellow Intermediate Yellow Leviathan, Danish Studstrup, etc. The so-called sugar mangels and sugar beets have shown no superiority; some varieties have ranked high, but most of them have been inferior. With swedes, the results have been markedly in favour of the Globe type; the others being lower in yield, in percentage of dry matter and in general quality. Variety testing has not been sufficiently extensive to warrant a statement as to the best kinds, but it has been found that the seed of many varieties placed on the market is of poor quality. In mangels, to a greater extent than in swedes, the crop has frequently been lacking in trueness to type and uniformity, and often extremely prongy and coarse. This condition induced an effort to select the more desirable types, and, by producing seed to secure more valuable strains.

RESULTS OBTAINED

No difficulty was found in producing high quality seed of mangels, swedes, carrots and turnips. The seed grown has been markedly superior in power of germination and in vitality to commercial seed. In addition, a superior crop has been grown because of the fact that the seed was produced only from good roots. From the beginning greater smoothness and greater uniformity as to general type and colour were obtained. The attempt to isolate superior pure strains has given very encouraging results. A few have yielded as high as 15 per cent above the best commercial varieties. It is necessary to test these still further to ascertain whether or not the superiority is permanent and to determine which of the strains are the best.

A number of cultural experiments are being conducted, to determine what influence certain practices have on the yield. In these investigations two factors have shown themselves to be of special importance. These are, the time of seeding and the time of thinning. The experiments have shown quite clearly that the root field should be sown as early as the season will permit and that the stand should be thinned out at a very early stage in the development of the crop. For the first seeding, May 8th was arbitrary chosen; the other seedings follow at intervals of two weeks—till June 8th for mangels, and June 22nd for swedes. Over a period of six years the delay of two weeks in the time of seeding has, with mangels, reduced the yield by fourteen per cent and with swedes by fifteen per cent. This decrease in yield is equivalent in feeding value per acre, in the first case to 30 bushels of oats, and, in the second case, to 28 bushels. The experiments in time of thinning have shown that the stand should be thinned out as the first true leaves are formed between the two seed leaves. Any delay in thinning after that time has the effect of decreasing the yield.

THE BUD MOTH

Experiments conducted by the department of Biology showed that two sprayings with arsenate of lead before blossoming time were quite effective in controlling the Bud Moth, an insect that is probably more destructive to the apple than is the Codling Moth in Western Quebec.

ONTARIO AGRICULTURAL COLLEGE

THE SOIL SURVEY; THE STUDY OF WHEATS

BY R. HARCOURT, B.S.A., PROFESSOR OF CHEMISTRY

MUCH time is spent in the chemical laboratory in the examination of materials of various kinds, sent in to us by correspondents. Sometimes there arises from these matters for investigation, as, for instance, regarding some new insecticide or fungicide, or some new fertilizer. The main line of our work this year, however, has been in connection with our soil survey, and with our study of wheats and wheat flours and the flours of other grains than that of wheat.

The main portion of our time has been devoted to our soil survey. The province, from Windsor as far east as Kingston, has been covered in the preliminary survey, and a great variety of types of soils have been found. Demonstration plots on some of these types have been started, and are giving exceedingly interesting results.

The most interesting part of the work in connection with the wheats this season, has been the studying out of the proportion of flour of other grains than wheat that may be used in the making of bread. With the present shortage of wheat it would seem as though the use of certain amounts of these flours in all our bread should be made compulsory.

FARM BUTTER-MAKING PROBLEMS

BY H. H. DEAN, B.S.A., PROFESSOR OF DAIRYING

EXPERIMENTAL work in dairying at the Ontario Agricultural College carried on in 1917 related chiefly to butter-making. The cause of difficult churning and of variation in weight in print dairy butter received special attention.

The causes of difficult churning were studied as to the effects of: breed of cows, feed of cows, lactation period, percentage of fat in or richness of cream, temperature of the cream at time of churning, ripened vs. sweet cream, and amount of cream in the churn. Briefly, the results were: little or no difference was observed by churning separately the cream from three breeds of dairy cattle—Ayrshire, Holstein and Jersey. Sometimes the cream from one breed took a long time to churn and sometimes that from another breed. Neither was there very much difference in the losses of fat in skim milk and buttermilk, nor in the quality of the butter made from the three breeds.

Cream from cows fed in the stable churned as readily, or even more so, than did cream from the same cows when on grass feed.

The cream from cows on stable feed milking for less than two months churned in 21 minutes; and, from those milking two months and under six months on stable feed, the cream churned in 39 minutes, an increase in the time required for churning of eighteen minutes. On grass in September, the cream from the group, over two and under six months milking, took 52 minutes to churn, and, a group milking over six months, took 33 minutes to churn. Owing to scarcity of milk in the dairy herd, it was not possible to make further tests, but the results indicate more difficult churning of cream from cows advanced in lactation as compared with churning cream from fresh cow's milk. The work will be continued.

The churning tests as to the effects of richness, ripeness and temperature of cream were made in a No. 3 size barrel churn, having from two-and-one-half to three gallons of cream for each churning. The results were:

Kind of Cream	Lb. cream churned	Per cent fat in cream	Temp. cream D F.	Minutes churning	Per cent fat in butter milk	Average score of butter Max. 100
Rich	30	28	52	29	.14	95.75
Thin	30	16	56	38	.10	95.75
Thin and warm	30	16	56	38	.10	95.75
Thin and cold	30	16	52	54	.15	93.
Rich and warm	30	28	52	29	.14	95.75
Rich and cold	30	28	46	40	.07	95.5
Normal temp	25	26	54	41	.35	95.
High temp	25	26	69	12	2.40	93.5
Ripe cream	32	26.5	50	30	.15	94.5
Sweet cream	32	24	50	48	.70	94.5
Normal quantity in churn	32	26.5	50	30	.15	94.5
Churn half full	63	26	50	70	.15	94.5

CONCLUSIONS:

1. A thin cream (16 per cent fat) took a longer time to churn than did rich cream, or cream containing from 25 to 30 per cent fat. A thin cold cream was still more difficult to churn, taking nearly double the time to churn as did normal cream at ordinary churning temperature.

2. A rich cream, too cold, also required a long time for churning, but gave an exhaustive churning; that is, one with very little loss of fat in the buttermilk.

3. A high churning temperature caused the butter to come quickly, but caused an excessive loss of fat in the buttermilk, and the quality of the butter was poor.

4. A well-ripened cream churned in a shorter time and with less loss of fat in the buttermilk than did similar cream churned sweet. It is advisable on the farm to ripen cream, as a rule.

5. A small barrel churn filled half full of cream took 40 minutes longer to churn than did a churning of similar cream when the churn was but one-third full. The churning, one-half full, rose four degrees in temperature after churning for thirty minutes. A churn with too much cream in it is a cause of difficult churning.

SHRINKAGE AND VARIATION IN WEIGHT OF FARM DAIRY PRINT BUTTER

Print butter wrapped in parchment paper, or cheese cloth, both dry and wet, and held for two weeks in cold-storage at a temperature of 35 degrees to 37 degrees F. lost in weight from .11 to .16 of an ounce. Similar lots held in a cellar at a temperature of 48 degrees to 55 degrees F. lost in weight from .3 to .4 of an ounce in fourteen days. Print butter held for about two weeks would require to weigh from 16¼ to 16½ ounces when made and wrapped in damp parchment paper, in order that the package of butter might weigh full sixteen ounces when sold.

The more salt that is added to the butter at the time of making, the greater the shrinkage under similar conditions of storage. Butter containing less than one per cent of salt, lost weight to the extent of 6.32 of an ounce per pound in two weeks, while similar butter, under similar conditions containing 3.2 per cent salt, lost 15-32 of an ounce; and butter with 7.2 per cent salt lost 27-32 of an ounce per pound in fourteen days.

There are also considerable differences in weight of prints out of the same lot of butter, and made by the same person using the same printer. These variations may run from 3-32 of an ounce to as much as 11 0-32 of an ounce more by packing the butter firmly into the printer as compared with loose printing. Different persons using the same printer on similar butter got variations of from 1-8 to ¼ of an ounce in the weight of prints.

CONDITIONS AT THE TIME OF SEPARATING WHICH AFFECT THE PERCENTAGE OF FAT IN THE CREAM

The tests of 1917 showed the following rates:

1. An increase in the temperature of the milk from 70 degrees to 85 degrees and to 100 degrees F. at the time of separating, with four-hand machines, caused a decrease in the average percentage of fat in the cream from 43 to 41.6 to 39.5 respectively. Similar results were got with a belt power machine and with a steam turbine, when the cream screws were set to give a cream testing from 30 to 40 per cent fat. When the cream screw on the turbine machine was changed so as to produce a cream testing 50 per cent fat, the temperature at which the milk was separated (80 degrees to 140 degrees F.) had little or no effect on the fat content of the cream.
2. When hand cream separators were run at an average of six revolutions of the handle per minute below normal speed, the effect was to lessen the percentage of fat in the cream an average of 4.5 per cent., and to cause a greater loss of fat in the skim milk. On the other hand, when the speed was increased six revolutions of the handle per minute above normal speed, the cream tested an average of six per cent higher in fat. A fairly general effect of varying speed on a cream separator is, an increase of one per cent fat in the cream for each increase of one revolution of the separator handle above normal, and a corresponding decrease in fat percentage for speed below normal. For uniform tests of cream the speed should be as uniformly normal as possible. Any variations in speed cause a variation in the test of cream.
3. When a uniform quantity of either water or skim milk is used for flushing the cream from a hand separator bowl, after creaming varying quantities or weights of milk, will cause a variation in fat percentage of the cream. In tests with four makes of machines, and where one quart of warm water was used for flushing the bowls after separating 100 lb. milk, and allowing all the flushing to run into the cream pail, the average percentage of fat in the cream was 42; under similar conditions, but separating only 50 lb. milk, the average test of the cream was 41.1 per cent.

Where one quart of skim milk was used after separating 100 lb. and then 50 lb. whole milk, the cream tests were respectively 42.4 and 41.9 per cent fat.

MANITOBA

FORAGE CROP IMPROVEMENT—REPORT OF PROGRESS

BY WILLIAM SOUTHWORTH. M.Sc.. Agr., AGROSTOLOGIST, AGRICULTURAL COLLEGE

TO the intelligent farmer the question as to how he may profitably increase his crop production has always been one of outstanding importance. At this time, when he is asked to produce "More than usual," this question is brought to his attention with even greater force than usual. In order to increase the total amount of our food supply it is necessary that the producer adopt either one or more of the following practices:—

1. Increase the area devoted to the growth of the best food producing crops.
2. Introduce improved methods of land and crop management.
3. Plant good seed of the best varieties of the best food producing crops.

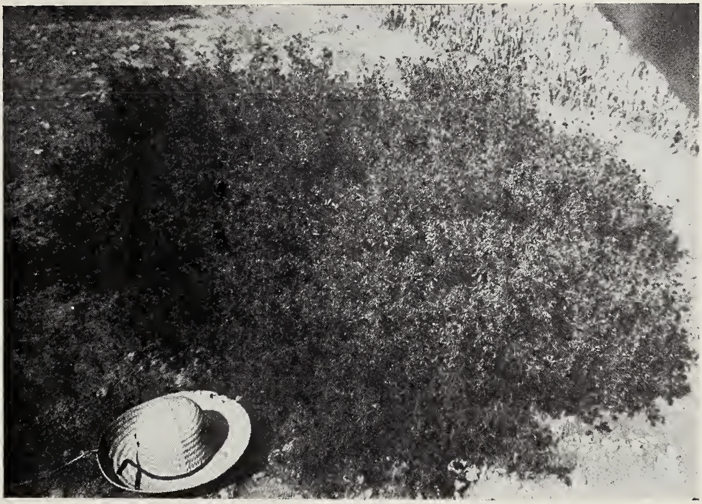
From the above it will be readily seen that to ensure that the producer may either increase the area under cultivated crops, or attend more thoroughly to land and crop management, he must have more farm labour, which is rapidly becoming more and more difficult to obtain.

Under such conditions it is of the utmost importance that the labour employed should be used to the greatest possible advantage. In order to attain this end, we at once see the importance of growing crops having the highest productive power, and of selecting improved varieties of grains, forage crops, root crops, or any other crops which may be grown; and, by this means, endeavouring to increase crop production to the greatest possible extent with the limited amount of labour which is available.

With a view to increasing crop production by plant improvement, experiments have been conducted at the college during the past two years, special attention having been given to alfalfa.

SCHEMES FOR THE IMPROVEMENT OF ALFALFA

In a former issue of THE GAZETTE* a brief outline of the cross-breeding schemes for the improvement of alfalfa was given. Attention was there directed to the poor seeding properties of existing strains of alfalfa, and to the urgent necessity of trying to breed strains having superior seeding qualities. With this object in view, experiments in crossing alfalfa with Black Medick were commenced in 1911, and subsequently, in 1913, in order to enhance the vigour of the hybrid, sweet clover



YELLOW FLOWERED ALFALFA PLANT

FIG 1—A very hardy and vigourous type. This plant has been crossed with common alfalfa. From the resulting hybrids, seed has been obtained from which it is hoped that plants may be developed having the hardy properties of the yellow alfalfa combined with the good forage qualities of common alfalfa.

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* See May, 1916, pages 445-447.

was introduced into one of the original first generation cross-bred plants.

The work commenced at the Ontario Agricultural College in 1911 was transferred to the Manitoba Agricultural College in 1915, and over 1000 plants of the second and third generations were raised and planted out in individual hills. They made good growth during the summer and came through the unusually severe winter of 1916-17 with very little injury. During the past summer the plants grew luxuriantly, and opportunity was afforded of making definite observations and notes on the various types. The outstanding plant characteristics most closely studied were *seeding properties, quality of forage; and rooting habits.*

In summarizing the results of the observations made we have come to the conclusion:—

1. That out of the thousand plants studied there are at least two plants which show outstanding merit as seed producers.

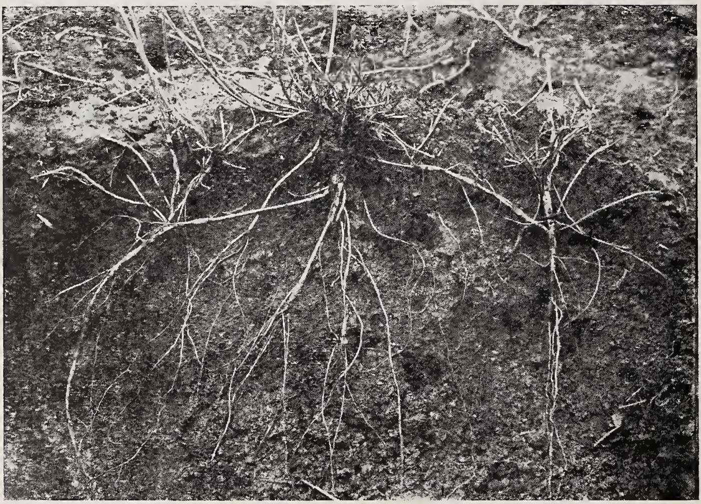
2. There are three plants which apparently have superior merit for quality of forage.

3. Several plants exhibit a tendency to spread by means of underground stems and give good promise of being well adapted for pasturing.

4. No single plant has yet appeared which possesses both good seeding ability and good forage properties. The plants which seed well produce inferior forage, and those which are the best forage plants are almost sterile.

However, having isolated distinct types of plants, each having its peculiar merit, our purpose now is to test these plants to see if they have the power to transmit their distinctive properties to their progeny. In other words, to test the plants to see if they breed true to type.

If we are fortunate in having isolated individuals, each one breeding true to its own particular valuable characteristic, then our future schemes must be designed with a view to bringing about a combination of



YELLOW FLOWERED ALFALFA PLANT

FIG. 2—The soil has been removed, exposing the root system. A small percentage of yellow flowered alfalfa plants produce this spreading root system. By crossing such plants with common alfalfa it is anticipated that a variety will be developed which will be hardier than existing strains of common alfalfa, and also better adapted for grazing.

the good qualities possessed by each several plant into one single plant. To accomplish this we shall, of course, have to resort to the intercrossing of these select plants. As to the best method to adopt by which a combination of these varied characteristics may be brought together and fixed, this cannot be decided upon in advance, and our methods may require frequent modification so as to suit the varied conditions that are likely to arise as the work progresses.

We can, however, be certain that several years of steady and persistent work will be necessary in order to make any satisfactory progress toward a solution of the problem.

HARDY AND TENDER STRAINS OF ALFALFA

To ensure the rapid spread of alfalfa in Canada, and enhance its productive power, it is essential not only to have strains which seed well and yield well, but these strains must also be hardy and withstand winter killing at least for several years. Seed from hardy strains of alfalfa is usually expensive and not always easily obtained. Seed from tender strains costs less money and can be readily obtained. Many Canadian farmers have been unfortunate in purchasing seed produced from these tender strains, which, on killing out during the first or second winter, has led some farmers to stop sowing alfalfa, and now they naturally look upon the crop with suspicion.

HYBRIDS OF COMMON ALFALFA WITH YELLOW-FLOWERED ALFALFA

Generally speaking, the yellow-flowered types of alfalfa are of inferior quality and seeding ability, yet they generally stand winter killing much better than the common violet-flowered types.

Having in mind the necessity of developing hardy strains of alfalfa for Canadian conditions, and at the same time keeping up its value for forage and seeding ability, an attempt is being made to effect a combination of the hardy properties of yellow-flowered alfalfa with the forage qualities and seeding properties of common alfalfa.

Fertile crosses of common alfalfa with the yellow-flowered type can be obtained without any great difficulty. For the purpose of this cross a yellow-flowered plant, specially selected for vigour and hardiness, was crossed with a plant of common alfalfa, selected for its good forage properties and seeding habits.

Reciprocal crosses were made, and, in all, thirty-six first generation plants were raised. These were planted in the spring of 1916, and the present season they all proved to be strong, vigourous plants, and sufficient seed was secured from each plant to continue our studies of the second generation. In this generation we may hope to find one or more plants having a combination of some of the valuable characteristics of the original parents—common alfalfa and yellow-flowered alfalfa.

IMPROVEMENT BY SELECTION

In conjunction with the above schemes, an attempt is being made to develop superior types of alfalfa by straight selection. The method practised is briefly as follows:—

1. Superior plants from the best strains obtainable were first selected and allowed to seed.
2. Seed from these choice plants was planted out in individual hills and singled out to one plant; after the plants had reached maturity further selections were made and seed obtained to plant a new plot.

By repeating this process of selecting and planting from the best plants it is hoped eventually to weed out all inferior plants, and thus markedly increase the average productive capacity of the remaining plants. There is also just a possibility that a plant may be isolated which is decidedly superior to the average of the best plants, and that, by reproducing this plant, a distinct strain of alfalfa may be established having an all-round superiority to the average. Such a plant has not yet been found.

At the present time we are working with selections from eight different lines represented by over 4,000 individual plants. Of these eight lines there are three which have been carried through three selection periods. One of these lines appears to have both good forage qualities and seeding ability, but it remains yet to be tested as to whether it will succeed equally well under ordinary field conditions, and also continue to successfully withstand our western winter.

THE VALUE OF PEDIGREED SEED

NOVA SCOTIA

BY JOHN M. TRUEMAN, B.S.A., PROFESSOR OF AGRICULTURE

WE have no experiments to report from the Farm Department showing the difference in yield between pedigreed and ordinary seed. The only figures we have at hand show results obtained for three years from two strains of one variety of oats. The seed has been carefully selected for some years for both strains, and yet invariably one strain shows a higher yield than the other. This illustrates the value of pedigree in grain even where both strains are from selected seed.

NOVA SCOTIA, STAND OF STRAIN No. 1 IN 1914

Banner Oats:	Yield in Bushels per Acre 1914	1915	1916
Strain No. 1.....	72	58	70
Strain No. 2.....	64	50	43

QUEBEC

BY JAMES MURRAY, B.S.A., PROFESSOR OF CEREAL HUSBANDRY

THE outstanding requirement in good seed is that it be able to reproduce plants with desirable characters. A pedigree is valuable only in so far as it serves as a guide to the purchaser in identifying the seed as having these desired qualities.

Pedigreed seed might be defined as that grown from plants with a known record, and strictly speaking the definition is correct. But for practical purposes it might better be described as seed of desirable varieties that has been grown with sufficient care to insure its genuineness and purity. To arrive at a fair estimate of the value of a lot of pedigreed seed it is necessary to know the behaviour of the variety under the climatic and soil conditions where it is to be grown. If information on this point be lacking it can best be determined by an actual trial with other varieties under control conditions. This comparative testing of varieties is essential to a proper valuation of the characters of any one sort. Statements of yield, quality, date of maturity, disease resistance, strength of straw, etc., for any variety may be expressed in percentage of an ideal, but it is more generally intelligible if it be in comparison with one or several well-known varieties.

The extent to which varieties differ in character and behaviour is illustrated by the following figures:—

VARIETIES OF OATS—MACDONALD COLLEGE

Average of Eight Years

VARIETY	Days Maturing	Per Cent Hull	Yield per Acre
Early Triumph	95	31.9	74.64
Early Gothland	97	30.7	60.60
Daubeney	82	25.5	72.20
Banner	95	30	72.05
Joanette	94	26.9	58.20

VARIETIES OF MANGELS—MACDONALD COLLEGE

Average of Five Years

VARIETY	Yield per Acre, Tons Roots	Yield per Acre, Tons Dry Matter	Keeping Quality
Giant Yellow Intermediate	27.085	3.119	8.5
Barres' Cylinder	30.657	3.334	8.
Golden Tankard	26.241	2.821	10.
Our Ideal	29.700	2.643	4.
Yellow Leviathan	27.713	2.760	8.

It is apparent that of the oat varieties mentioned some are more valuable than others for conditions similar to those obtaining here. Under other climatic conditions their behaviour would probably be quite different. For example, Daubeney, a very early maturing sort, usually yields remarkably well here because it is well filled before the extremely hot weather of July interferes with its growth, while the later maturing varieties suffer severely. In districts not subject to hot dry weather in midsummer, Daubeney would probably yield poorly compared with Banner or Early Triumph. The Joanette variety again is a very heavy producer of grain on deep rich soils, but gives a poor account of itself on soils that are light or poorly supplied with moisture. In the mangels, too, the comparative standing of the varieties would probably be altered if the trials were conducted under different soil and weather conditions. Varieties of crops must, therefore, be selected on a basis of their performance under conditions similar to those under which they are to be grown.

METHOD AND SELECTION

Even our best varieties are, in many cases, mixtures of plants of varying usefulness. The plants probably resemble one another in many general characters, but differ widely in economic value. Selection within the variety is, therefore, necessary not alone to insure purity, but more particularly to isolate heavy yielding from light yielding individuals. In this work different methods are followed by different workers. The system of mass selection is practically that followed by the members of the Canadian Seed Growers' Association. The operator selects during the growing season typical heads from plants that appear to be vigourous and productive. The seed from the selected heads is sown *en masse* in a separate plot, and a further selection made the following year. The value of the method depends largely on the care with which the selection is made. An improvement in purity usually results if care has been taken to select only typical heads of the variety, but careless selection may result disastrously. An actual increase in yield may result if the operator has been fortunate in selecting heads from plants of better than the average yielding ability, but there may be a decrease in yield if heads have been selected from plants specially favoured in location and abnormal in growth. There is almost sure to be an *apparent* increase in yield through the specially selected seed being planted with unusual care on well prepared land.

In the other method the selections are made of individual plants that have been grown in large numbers and in such a way that the general character of each plant may be studied. Only those are retained that have desirable field characters and are high producers. The progeny of each selected plant is grown separately under control conditions, and by a process of elimination only a few of the best are retained for increase. The details of the methods followed differ with different operators, but all work on the principle that a commercial variety is made up of plants with different projected efficiency, that by growing large numbers as individual plants under uniform conditions the differences become apparent and permit selections to be made intelligently, and that by propagating separately the desirable plants that are heavy yielders superior strains may be produced. Field trials of the selected strains must be carried on to finally test the value of the selections. Many varieties of grain now extensively cultivated have been produced by this system of selection.

The following particulars relating to several numbered pure-line selections of Joanette oats and Mandscheuri barley convey some idea of the possibilities of this method of selection.

SELECTIONS OF JOANETTE OATS AND MANDSCHEURI BARLEY

Average of Five Years

STRAIN NO.	Days Maturing	Length of Straw	Per Cent Hull	Yield per Acre
Joanette (Original)	99.2	2′-9½″	26.9	59.67 bus.
“ No. 407	105.6	2′-6″	25.4	59.56 “
“ No. 607	98.6	3′-1½″	25.3	70.09 “
“ No. 2007	94.	2′-11″	28.8	55.28 “
“ No. 2707	103.4	2′-9½″	28.1	55.02 “
“ No. 3307	97.	2′-6″	24.4	53.89 “
Mandscheuri (Original)	86.8	3′-1½″	.....	62.84 “
“ No. 6908	86.8	2′-11″	.....	69.95 “
“ No. 7008	84.6	3′-1½″	.....	66.69 “
“ No. 7408	86.2	3′- ½″	.....	67.29 “

Of the Joanette strains, No. 607 is undoubtedly superior to the original; No. 407 is of about equal value, while the others are of decidedly lower value. All of the barley strains on the other hand are an improvement on the original variety. The pedigrees of all these strains are equally long, each represents careful work over seven years, but the strains are not of equal value under any given set of conditions.

The other method of improvement—hybridizing—is undertaken with the object of uniting in one individual plant—the progenitor of a variety—the good points of two or more plants. A number of our best varieties of cereal crops are of hybrid origin. Many others with a long record of careful work behind them have been introduced only to be discarded after a few years. With hybrid varieties, as with those of other origin, the final test of usefulness is their behaviour under field conditions on the ordinary farm. Unless they are able there to demonstrate their superiority they are soon superceded by others better able to stand the test. Performance is the final test of value, and unless a variety or strain has a record for this it is doomed speedily to disappear.

MANITOBA

BY T. J. HARRISON, B.S.A., PROFESSOR OF FIELD HUSBANDRY

THE value of good seed in field crop production makes itself manifest in three ways, namely, higher yields, better quality, and cleaner farms. This has been demonstrated during the last three years on the field husbandry experimental field at the Manitoba Agricultural College.

The value of the fanning mill as a means of preparing seed was tested out in the following manner: A sample of No. 3 Northern wheat, weighing 60 pounds per bushel, was secured from a farmer's wagon at the elevator. This was cleaned through a standard fanning mill three times, drawing approximately 10 per cent at each cleaning. The average yields on the table below show the important part that the fanning mill plays in the increased production:—

	Bus.	Lb.
Uncleaned, No. 3 Northern	30	20
Cleaned once	33	
Cleaned twice	34	
Cleaned three times	34	30

The increase due to fanning is 4 bushels and 10 pounds. If wheat is worth $2.00 per bushel it means an increase in the wealth of the individual and nation of $8.30 per acre. This increase is not possible, however, on most of the farms, because better wheat than No. 3 Northern is kept for seed and would have been cleaned at least once. The experiment is of value in indicating the advantage of thoroughly cleaning the seed from the standpoint of yield alone, because much of the grain sown is only run through the fanning mill once and contains some weed seeds and many small and immature grains.

The quality of the grain produced from the different classes of seed was also interesting. Since the quality of the wheat varies according to the season the crops for the year of 1915 only are cited:—

Uncleaned, No. 3 Northern	No. 4 rejected
Cleaned once	No. 4
Cleaned twice	No. 3 Northern
Cleaned three times	No. 3 Northern

It must be noted that the original seed contained enough wild oats to reject the sample; naturally the crop from that would be badly contaminated with wild oats and grade rejected. The fanning mill not only made the succeeding crop go into the straight grades, but on the second and third cleaning raised the quality one grade. The effect of the use of the fanning mill in the control of weeds is not so easy to arrive at. The plot, which was seeded with the uncleaned seed, was fall ploughed and sown the succeeding year with absolutely clean seed. The estimate of the growing crop was that it contained 10 per cent wild oats. Therefore, if the farmer has a reasonably clean farm he should exert every possible effort to secure clean seed.

In connection with this experiment one plot was each year sown with Canadian Seed Growers' Association registered seed:—

KIND OF SEED	YIELD	
	Bus.	Lb.
Registered Seed, No. 2 Northern	39	40
No. 3 Northern, cleaned three times	34	30

This table shows the advantage of selecting the seed while growing. Unfortunately there are not enough C.S.G.A. members to produce sufficient seed for the market. The next best thing then for the farmer is to use the fanning mill on the grain he has selected for seed this winter. The cleaning can be done in a comparatively slack time, and it will have a material effect on the increasing of production.

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITIES

BY J. G. ARCHIBALD, B.S.A., DEPARTMENT OF CHEMISTRY, AGRICULTURAL COLLEGE

THE Government of Nova Scotia have by order-in-council appointed a Development of Agricultural Resources committee constituted of six members of the legislature selected from both sides of the House. The chairman is D. A. Cameron, K.C., M.P.P. for Cape Breton.

This committee is at present deliberating on the best methods for securing seed and fertilizer. It has authorized the publication of a series of bulletins, number one of which is just off the press. The title of this bulletin is "Wheat Growing in Nova Scotia." The object of the bulletin is the encouragement of increased wheat production this year. The wheat situation in the province is reviewed and prospective growers are urged to obtain their seed supply at once. Complete and up-to-date information is given as to the best methods of cultivation, manuring and seeding, also as to the varieties most suitable for our conditions. One million bushels of wheat from Nova Scotia in 1918 is the standard set by the Department. The policy of the committee is to assist seed firms and co-operative farmers' organizations, to purchase seed wheat in carload lots, so that they will get the advantage of lower prices and be in a position to sell to farmers proportionately.

A second bulletin on bean culture by Prof. P. J. Shaw has just been completed. Prof. Shaw is making a study of hardy varieties of beans. For local purposes, he divides beans into three classes, namely, early, second early and late. For the counties that are particularly adapted to bean growing, namely Annapolis, Kings, Hants and Lunenburg, he recommends varieties coming in the second class. Good representatives of this class are the Early Yellow Eye, Soldier and Goddard. For the other counties, he advises nothing later than the early varieties, such as the Early Yellow Six Weeks and what is known locally as the Antigonish bean.

LIMESTONE GRINDING

The limestone crusher which was operated throughout the Margaree Valley all last season has been forced into idleness by the severity of the winter in that district. The following excerpts from the report of Prof. L. C. Harlow, Chemist, regarding the amount of work done, cost of grinding, etc., will be of interest:—

"Reports of the work are complete to Nov. 10. The following summary shows the cost of the stone outside the quarrying:

Total cost................	$1,918.81
Total tons ground..........	940.
Cost per ton................	2.04

"With what is considered to be a fair charge for quarrying, namely, 50c. per ton, added, the cost of preparing the ground limestone would be $2.54. In reaching this conclusion, it is only fair to state that the cost is much higher than it would be were the machine owned and operated by private parties, or, what would be better still, by the eight agricultural societies in the Margaree Valley, working in co-operation. The aim has been to get as many as possible to use the stone. In some cases it was necessary to limit parties in the amount taken. There are 114 who used the stone, in quantities varying to one-half a ton to twenty-four tons. Were the stone used in any one of these sections as it should be, the machine could be busy six months, steadily grinding about 1500 tons or more. The expense of moving has added very much to the cost of the stone.

"The reports of the weeks ending September 15th, when conditions were the most favourable, and October 27th, when least favourable, will give an idea of the relative cost. When conditions were good, the cost as far as labour is concerned, was 75c. per ton. When under the worst conditions, the cost ran up to $3.00 per ton. While it is impossible to state, from the present experiment, what ground limestone would cost when produced commercially, our experiment is designed to show what the farmers can prepare it for when working co-operatively."

ONTARIO

JUDGING AT SEED FAIRS

BY C. A. ZAVITZ, B.S.A., D.Sc., PROFESSOR OF FIELD HUSBANDRY, AGRICULTURAL COLLEGE

It is undoubtedly true that incompetent judging is one of the reasons why seed exhibits at fall fairs throughout the country have not been a greater success. In many instances local judges are employed who do not have an expert knowledge of what constitutes an ideal sample of seed grain. In numerous cases the judging is done quickly and carelessly. It frequently happens that the judges appointed are well acquainted with the various exhibitors, and sometimes jealousies arise on that account, and the best exhibitors become discouraged and discontinue the work. At many exhibitions a comparatively few professional exhibitors who make a business of securing some samples of grain which they carefully prepare and then exhibit from one place to another in order to secure as much of the prize money as possible throughout a circuit of fairs held during the season. From exhibits of this kind but little value accrues as the exhibits do not represent a supply of good seed that is purchasable. If the directors of agricultural societies hope to make their exhibits of real service, they should exclude the professional exhibitor as much as possible and have the exhibits only from the seed grain growers, and all the entries judged entirely on their merits.

At the Provincial Winter Fair held in Guelph in December of each year, entries in the Seed Grain Department are made in one or more of three divisions, viz., (1) The Open Class, in which all farmers are eligible to enter exhibits; (2) the Field Crop Competitions Class, in which seed can be entered that was taken from fields receiving prizes in the Standing Field Crop Competitions, and (3) the Canadian Seed Growers' Association Class, which is open only to entries by the members of this Association.

THE RULES THAT GOVERN

It is stated in the general rules and regulations that in the Open Class "each exhibit must be a true sample of the total quantity offered for sale by the exhibitor." It will, therefore, be noted that in every instance the seed shown at Guelph, in any of the three classes, represents a larger supply of seed on the farm where it is grown. In many cases the home supply is represented by hundreds and, in some instances, thousands of bushels. In the catalogue the names and addresses of the exhibitors are given, the varieties are named, the home supply of seed is stated, and the price per bushel is usually mentioned. Much of this information, besides being entered in the catalogue, is also mentioned on the exhibits themselves. Before the close of the exhibition all the grain from the Field Crop Competitions, and in the Open Class, and part of that shown by members of the Canadian Seed Growers' Association, is sold by auction for seed purposes to the highest bidders. It will, therefore, be seen that the seed exhibit of the Provincial Winter Fair is unique in several respects, and embodies features which might well be practised at some of the other agricultural exhibitions.

THE JUDGING

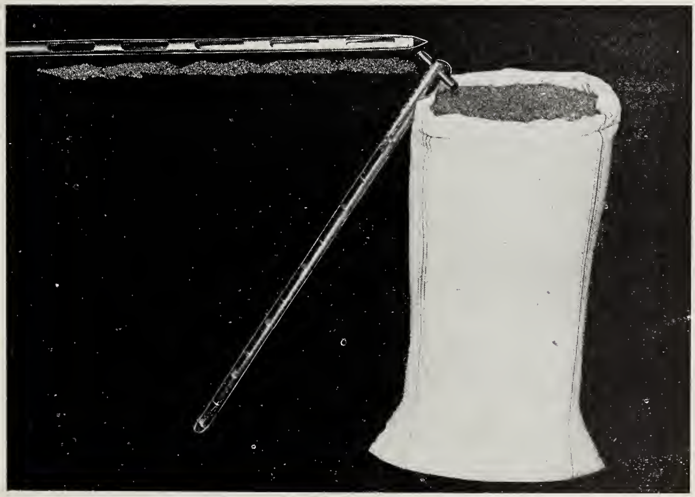
Judging at the Provincial Winter Fair is carried out with an unusually large amount of detail. This is made possible from the fact that parts of two days are allowed for judging, and that a sufficient amount of help in the Field Husbandry Department at the college is thus enabled to make a very careful examination of each exhibit. Even though the number of exhibits is large, thorough work can be accomplished. It is true that the same process cannot be carried out in all exhibitions; and yet there are features of the judging work at Guelph that might with advantage

JUDGING AT SEED FAIRS

Samples of forty-nine entries of white oats comprising four sections of Class 351 of the Seed Exhibit of the Provincial Winter Fair held in Guelph in December, 1917. Each plate next to the sample bag contains a definite quantity of oats taken from the one bushel lot as required in the contest. The defective grains and the impurities taken from the samples are shown along the outside edges of the table, either loosely or in plates.

be applied at every seed fair.

In the first place, special attention is directed to the method of examining the exhibits. The plan frequently practised at the small fairs has been to make awards from casual observations of the grain at the tops of the bags as they are shown by the exhibitors without making any determinations from the lower portion of the sacks. A far better way is to take samples from throughout each bag and place these samples on a table, where they can be carefully and critically examined for uniformity, maturity, soundness and purity, etc., of each lot. This can, and should, be carried out at practically all exhibitions throughout the country. It enables the judge to be more accurate in his work, and insures the confidence of the exhibitors. In all cases samples should be taken from the lower as well as from the upper part of the bag. This can be readily accomplished without difficulty by pushing the hand deeply into the bag. The work, however, can be facilitated by the use of a grain sampler made in the form of a double cylinder about three feet in length. By opening the cylinder after it is pushed to the bottom of the bag a sample can be secured representing the entire column of grain. By emptying on the table the grain from the seed sampler it is comparatively easy to make a minute examination of the entire exhibit as it actually exists throughout the contents of each bag. At the Provincial Winter Fair the winter wheats, spring wheats, buckwheats, ryes, peas and beans are judged in this way. The oats and barleys, however, which have larger entries and keener competitions, are judged by making definite determinations at the college from a mixture of two cylinders of grain taken from each entry.



JUDGING AT SEED FAIRS
An exhibition bag of oats with sample taken from the entire length of the column of grain by use of a sampler

THE JUDGING OF WHITE OATS

In order to illustrate this work, tabulated results are here presented showing the determination made of the entries of white oats in the open class at the Provincial Winter Fair held in Guelph, December, 1917:—

Class 351, Section 5—Oats (Banner)

Catalogue number	Prizes	Percentage				Number of Grains Picked out of Four Ounces															
						Defective Grains of Oats									Other Grains				Weed Seeds		
		Beard	Maturity	Brightness	Plumpness	Double	Hulled	Black	Dun	Yellow	Brown	Badly Weathered	Green	Slim	Wheat	Barley	Rye	Flax	Wild Buckw.	Wild Tares	Thistle Balls
15	7	2	100	80	100	62	14				20	8		20	2	4					
16	2	0	98	80	90	4	16			2	6					2					
17	4	0	96	90	100	28	24				50	10	2								
18		7	98	70	60	220	12				4	4	20	50		4					
19	1	1	97	100	90	14	16														
20	6	4	90	70	80	14	38		2		2		12	44							
21		2	100	30	100	32	48				20	60	4			10				2	
22	8	2	96	80	80	22	36	2				2				8					
23		4	100	40	80	114	4		2	30				20		22					
24	3	0	99	90	90	14	32				44	8	8			2					
25		3	100	40	70	46	10				30		6	40		2					
26	5	6	96	80	90	40	4				12	4	6	30							

Class 351, Section 6—Oats (O.A.C. No. 72)

Catalogue number	Prizes	Beard	Maturity	Brightness	Plumpness	Double	Hulled	Black	Dun	Yellow	Brown	Badly Weathered	Green	Slim	Wheat	Barley	Rye	Flax	Wild Buckw.	Wild Tares	Thistle Balls
27	7	2	98	85	90	11	92				6	3	2								
28		6	100	40	90	52	121				36	15									
29		2	100	90	90	18	19	1			6		4			2				2	
30		3	98	100	100	3	111			2	5	2	9			36					
31		1	100	20	90	20	212				26	60	7		1	3					
32	10	8	95	80	100	49	38						12								
33	3	1	96	90	.90	7	152					2									
34	4	1	100	80	100	4	186						1	1							
35	1	0	97	100	90	2	69										1				
36	9	2	100	90	100	61	50					1				2					
37	5	0	99	80	110	10	9				1	4									
38		1	100	100	100	93	2				6	4	2		4	2½					
39		7	99	90	90	35	17	1			8		4			14				1	
41		3	99	90	100	3	59								1	88					
42	8	1	98	90	80	78	49				1		3		1						
43	2	0	98	90	100	10	105														
44	0	4	98	50	80	6	48					1	15	20		1					
45	6	2	100	70	100	1	27					9				1					

Class 351, Section 7—Oats (O.A.C. No. 3, Daubeney or Alaska).

Catalogue number	Prizes	Beard	Maturity	Brightness	Plumpness	Double	Hulled	Black	Dun	Yellow	Brown	Badly Weathered	Green	Slim	Wheat	Barley	Rye	Flax	Wild Buckw.	Wild Tares	Thistle Balls
46	1	1	99	90	100	5	190				18	3	6	3		4			2		
47	6	0	96	90	80	39	25				3		25	30	4	262			3	1	2
48	5	1	99	30	100	25	19						6			14					
49	3	2	98	90	90	24	49						1	5		7					
50	7	0	100	50	90	9	89				4		10	1		19		1			
51	4	0	92	80	80	12	65							20		15					
52	2	2	100	80	100	0	55									4					

Class 351, Section 8—Oats (any other White, correctly named.)

Catalogue number	Prizes	Beard	Maturity	Brightness	Plumpness	Double	Hulled	Black	Dun	Yellow	Brown	Badly Weathered	Green	Slim	Wheat	Barley	Rye	Flax	Wild Buckw.	Wild Tares	Thistle Balls
53	2	0	100	100	90	184	18				1										
54	4	0	100	60	110	4	14				60	16	2								
55		1	100	70	90	20	68				34	22				147					
56	7	2	99	90	100	5	82	1		3		8				16					
57	9	18	98	80	90	44	35	4		4	3	2		1	2	10	3				2
58	8	2	96	60	90	31	29	3			2	3				16	3				
59	6	2	98	50	100	7	95				1	20			1						
60	3	0	99	80	90	26	70				2	2				1					
61		18	98	70	90	17	16			2	2		1		5	107		2			
62		1	96	80	80	136	57	3			40	5	20			51					
63	5	0	100	80	110	39	1					1									
64	1		100	9	100	2	19					1									

Similar records were made for the black oats and the barleys in the Open Class and for all entries of oats and barleys exhibited in connection with the Canadian Seed Growers' Association, and also with the Standing Field Crop Competitions conducted through the medium of the agricultural societies.

THE USEFULNESS OF SEED EXHIBITIONS AT STAKE

The critical examinations made of the different samples of oats, as shown in the accompanying tabulated results, furnish important information regarding the quality of grain of the various entries. In addition to this information, determinations were made regarding the purity and the trueness of the varieties, the apparent weight per bushel, the freedom from foreign matter, the percentage of hull, etc. But few people realize that one hundred pounds of a thin hulled variety of oats might furnish from twelve to fifteen pounds more meal than one hundred pounds of an equally good sample of another variety of oats, but which is thick in the hull; or that two samples of the same variety of oats may vary to a marked degree in the amount of meal which they are capable of furnishing. In making a true record of oats entered in competition it is absolutely necessary to take many points into consideration. This is true, not only of oats, but of all classes of grain entered in competition. Much responsibility, therefore, rests upon the judges in knowing as many of the facts as possible and in making just awards. It is undoubtedly true that the work of the judges has a marked influence on the usefulness, the stability and the permanency of seed exhibitions.

EDUCATIONAL FEATURES OF THE BETTER FARMING TRAIN

COMMENCING the 27th of November and ending on December 21st, two cars equipped to demonstrate better methods in farming were run over the Grand Trunk lines from Cornwall to Port Hope on the main line and then on branch lines north and west, winding up at Agincourt.

Besides the demonstrations themselves, there were several experts who gave short talks to groups, or consulted with individuals about farming problems in which they were interested.

The attendance at the beginning was more or less affected by the Dominion election campaign. After that the attendance averaged much better. Probably from 100 to 600 and more visited the cars daily, including the senior pupils from the public schools and collegiate institutes of the places visited.

The Department of Education had advised the principals of the various schools to visit the cars. In most cases this was done. Their special time was from 10 a.m. to 12 noon. When they came they were organized in groups and each demonstrator explained his exhibit and emphasized the most important problems and how they might assist in helping to solve some of them.

In a number of cases we learned that the pupils were tested out as to what they learned and the teachers said the result was very satisfactory.

An evening meeting was held in a large number of the places and moving pictures were used to illustrate farm and household problems. A lady speaker was present to give a special address.

ACRE PROFIT COMPETITIONS IN 1917

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

THE Ontario Department of Agriculture through its Agricultural Representatives conducted 35 acre profit competitions during 1917, as well as eleven hog feeding competitions. These are open to young men who have taken the four weeks' courses in agriculture conducted by the Agricultural Representatives. The prize in each case is a two weeks' short course at the Ontario Agricultural College, transportation to Guelph and return and board and lodging while there. Where eight or more contestants finished in a competition two men are sent to Guelph.

In estimating the cost of operation, in the acre competitions, $5.00 per acre is allowed for the rent of the land, $2.00 for ploughing, 15c. per hour for manual and 10c. per hour for horse labour.

In the grain crops the competition was conducted on the five-acre basis. This was done to allow the contestants to enter the field crop competitions should there be one in their district. Calculations are made on the basis of one acre.

Following is the list of winners in the acre competition, giving also some interesting figures as to the cost of production and the profits:—

OATS

(65c. PER BUS.)

COUNTY	WINNER	Yield	Cost Prod.	Profit
		Bush.		
SIMCOE	Arthur G. Tudhope, R.R. No. 1, Hawkestone	80	15.78	36.22
BRANT	Russel A. Templar, Burford	72	15.13	32.19
KENORA	Chas. Skene, Oxdrift	67	14.80	28.75
NORFOLK	Erle Mott, O.A.C., Guelph	61	14.38	25.27
DUNDAS	Geo. Timmins, Inkerman	62 1/5	15.21	25.25
VICTORIA	J. P. Wilson, Woodville	54	14.53	20.24
WELLAND	K. W. Sexsmith, Ridgeway	54	14.53	19.11
YORK	Wilfred Maginn, Aurora	46	12.16	17.68
GLENGARRY	Donald McKinnon, R.R. No. 1, Alexandria	47	13.67	16.75
LAMBTON	Frank Burgua, Sombra	35	12.57	10.18

POTATOES

(90c. PER BUS.)

COUNTY	WINNER	Yield	Cost Prod.	Profit
MANITOULIN	Jos. Hodgson, Mindemoya	463	130.40	286.60
FORT WILLIAM	Valentine Bliss, Slate River	376	72.80	265.60
MUSKOKA	Gordon Hill, Hillside	364	83.05	244.55
FORT WILLIAM	Robt. Denison, Slate River	304	58.15	215.14
PORT ARTHUR	Wm. T. Price, Conmee	327	82.30	212.00
GRENVILLE	Arnold Goodin, Spencerville	321	82.90	206.00
PORT ARTHUR	Clair Kenny, Dorion	261	61.77	173.13
MIDDLESEX	Frank Farrow, R.R. No. 2, Mt. Brydges	231	55.55	152.35
LANARK	Lindsay J. Duncan, McDonald's Corners	107	85.32	107.28
RAINY RIVER	Fraser Ross, Devlin	187	63.70	104.60
RENFREW	D. L. Cameron, R.R. No. 2, Pembroke	165	148.50	87.25
NORFOLK	Elmo L. Riddle, R.R. No. 1, Wilsonville	126	44.81	68.59
YORK	Wilfred Holden, R.R. No. 2, Markham			
		Tons		
GREY	W. T. Riddell, Annan	26	18.85	78.56
SIMCOE	Ernest Smith, Smithdale	26	23.01	74.19
MIDDLESEX	Edmund Wark, R.R. No. 1, Strathroy	20¼	14.91	61.03
PETERBOROUGH	W. J. Barrie, R.R. No. 2, Norwood	18	17.28	51.03
PETERBOROUGH	Earl Barrie, R.R. No. 1, Birdsalls	15	12.22	45.53
BRUCE	Eldon Nicholson, Tara	14	18.55	35.26

CORN FOR SEED.

($1.75 PER BUS.)

COUNTY	WINNER	Yield	Cost Prod.	Profit
		Bush.		
LAMBTON	Stewart MacDonald, R.R. No. 2, Port Lambton	26	21.67	24.40

TURNIPS

(15c. PER BUS.)

COUNTY	WINNER	Yield	Cost Prod.	Profit
BRANT	John Edgar ,R.R. No. 3, Paris	867	22.94	107.11
WENTWORTH	Jas. Beaton, R.R. No. 2, Hamilton	560	21.80	62.20

MANGELS
(15c. PER BUS.)

Durham	Clarence R. Lovekin, Newcastle	650	32.10	178.35
Bruce	Jas. G. Armstrong, Formosa	531	25.57	54.08

WHEAT
($2.15 PER BUS.)

Renfrew	John D. MacLaren, R.R. No 2, Arnprior	34	18.20	54.90

WINNERS IN FEEDING HOGS COMPETITION

BY R. S. DUNCAN, AGRICULTURAL REPRESENTATIVE SUPERVISOR

THE object of the Feeding Hogs for Profit Competition is to encourage young men to raise and feed hogs by keeping accurate records of the feed they consume and to market their hogs when they have attained the proper weight for bacon purposes.

The hogs were selected when six weeks old, at which time the record work began. A value of $4.00 was placed on the young pigs at this age. Contestants were to feed three hogs, though a fourth was allowed to be fed and used as a spare in case of accident or disease. They were fed until 22 weeks of age, the records of feed being kept every week. In some cases hogs were weighed every week in order to note the gain.

Feed was valued as follows:—

	Per Ton
Ground Oats	$28.00
“ Barley	40.00
“ Peas	60.00
“ Rye	38.00
“ Wheat	50.00
“ Corn	35.00
Corn on the cob	30.00
Bran	30.00
Low-Grade Flour or Red Dog	36.00
Shorts or middlings	30.00
Tankage	50.00
Oil Cake	50.00
Grain Feed (name kind in report)	2.00
Skim Milk	5.00
Butter Milk	5.00
Whey	3.00

For pasture, the credited charge is $1.00 per hog.

The profit was estimated by valuing hogs, live weight, fed and watered at 17½c. per lb.

In awarding the prizes 50 per cent was allowed for highest net profit and 50 per cent for type and finish, which was arrived at by the use of the bacon hog score card.

The following are the winners.

COUNTY	WINNER	Breed	Average Cost Prod	Average Value	Average Profit
Manitoulin	Walter Galbraith, Spring Bay	Yorkshire	$10.48¾	$36.05	$25.56¼
Kenora	Jas. Hutchinson, Dryden	Yorkshire	16.56	42.00	25.44
Waterloo	Roland E. Maeder, Ayr	Yorkshire	15.87	40.42	24.55
Oxford	Harry L. Kaufman, R.R. No. 4, Bright	Yorkshire	17.12	39.81	22.69
Grenville	Willard K. Whitley, Spencerville	Yorkshire	13.66	36.10	22.44
Carleton	Orval Daley, North Gower	Yorkshire	9.47	30.98	21.51
Lanark	Harry S. McArton, R.R. No. 4, Almonte	Yorkshire	12.51	33.19	20.68
Lennox & Addington,	Clarence M. Spafford, Napanee	Chester White & Yorkshire	12.32	32.85	20.53
Grenville	Floyd Barber, Merrickville	Yorkshire	12.99	33.42	20.43
Peel	Harvey Speers, R.R. No. 3, Caledon	Yorkshire	9.73	28.00	18.27
Port Arthur	C. R. Bingham, Murillo	Cross Breed	9.09¼	24.26	15.17
Simcoe	W. S. Somerville, Stayner	Yorkshire	10.21	25.20	14.99

HAMILTON BOARD OF TRADE HELPS

FINAL arrangements have been made in regard to the programme which the Hamilton Board of Trade are putting through in order to increase hog production in Wentworth Country, reports Mr. W. G. Marritt, Agricultural Representative in that county. By collecting ten dollars from the members of the Board of Trade, the committee raised over four hundred dollars. They then bought nine young sows which were going to market. These sows were placed with farmers in different parts of the county. The farmers are to keep track of the feed, and the Board of Trade will pay them for this when the young pigs are ready to wean. The sows will then be disposed of, if possible, to the farmer who raised the pigs. One boy from each school will be allowed to have one of these pigs. The boy will be required to give his note to the committee of the Board of Trade for the value of the young pig, the note to come due in the fall when the boy makes a sale. The committee have made a conservative estimate of the money which they will have available in the fall. The sows will be worth about $150 to $175 more than the cost of the feed which they have consumed. It is figured that the boys will pay off the $400 indebtedness. That would leave $150 over to be used as prize money. Several business men have also offered cash prizes to be used in any way the committee see fit.

MANITOBA

TESTING SEED

THE cereal division of the Manitoba Agricultural College is carrying on a seed-testing service for farmers in the province of Manitoba. Below is an analysis of the first eighty-five samples received of the 1917 crop:—

Number of Samples Germinating	
91 to 100 per cent	12
81 " 90 "	12
61 " 80 "	24
41 " 60 "	15
31 " 40 "	8
21 " 30 "	4
11 " 20 "	7
0 " 10 "	3

From the above figures the following facts may be noted:—

1. Only 14.1 per cent of grain received will make first-class seed.
2. 14.1 per cent grades as second-class seed.
3. 28.2 per cent grades as third and fourth-class seed.
4. 43.6 per cent is unsuitable for seed purposes.

SASKATCHEWAN

THE LIVE STOCK PURCHASE AND SALE ACT

THE regulations adopted for the Live Stock Purchase and Sale Act of Saskatchewan, provide that applications for milch cows must be made to the Live Stock Commissioner by May 1st of the year in which delivery is desired. Applications for all other cattle, as well as of sheep and swine, will be received up to October 15th. Credit is to be given to the returned members of the Canadian Expeditionary Force to the extent of 90 per cent of the cost of the stock purchased, the loan to cover a period of three years. In order to receive stock under the provisions of any credit option, an applicant must be actively engaged in farming and a member of a grain growers' association, or a member of an agricultural society, or a shareholder or patron of a creamery operated by the Saskatchewan Co-operative Creameries, Limited, or a shareholder of a live stock improvement, or marketing, association organized and incorporated under The Agricultural Co-operative Associations Act, or an ex-soldier recommended by the secretary of the Returned Soldiers' Employment Commission of Saskatchewan. Applications from returned soldiers must be accompanied by a certificate signed by the Secretary of the Returned Soldiers' Employment Commission, declaring that the applicant has served overseas and is actively engaged in farming and worthy of credit. Patrons of a creamery operated by the Saskatchewan Co-operative Creameries Limited may be required to sign an order authorizing the manager to deduct the full amount of every alternate cream cheque, or such sums as will approximate one-half of the amounts due from time to time for cream or other dairy products supplied to the creamery by such patrons. These deductions are to be continuous until the entire debt is liquidated.

In the purchasing of pure-bred males credit will not be given for more than 90 per cent of the total cost of the animal supplied under this option. The notes are to be made payable, one-half at the end of the year following the purchase, and one-half at the end of the next succeeding twelve months. Not more than one bull, two rams, or one boar, may be supplied. The credit for grade females is also limited to 90 per cent. The amount of credit in this connection to any ex-soldier must not exceed $500.

A NEW DAIRY COMMISSIONER

MR. W. A. Wilson, who has been connected with the Dairy Branch of the Saskatchewan Department of Agriculture since 1906, has resigned the position of Dairy Commissioner to take the position of manager of the Saskatchewan Co-operative Creameries, Limited. Mr. F. M. Logan, formerly assistant to Mr. Wilson, has been appointed his successor. The change took place with the new year. Mr. Wilson, prior to the organization of Saskatchewan as a province, represented the Dominion Government dairy interests in Assiniboia and Saskatchewan. Mr. Wilson was born in Renfrew county, Ont., and Mr. Logan in Nova Scotia, where he was Superintendent of Dairying for the province. After taking his B.S.A. degree at Guelph, Mr. Logan joined the Live Stock Branch of the Dominion Department of Agriculture, from which he became Dairy Commissioner for British Columbia. He accepted the Assistant Commissionership for Saskatchewan in 1915.

ALBERTA

THE NEW STALLION ENROLMENT ACT IN FORCE

THE revised Stallion Enrolment Act, passed at the 1917 session of the Alberta Legislature, came into effect on January 1st, this year. The Act provides for the appointment of three sets of inspectors, who are required to report to the Stallion Enrolment Commission, which is composed of Dr. Percy Talbot, Provincial Veterinarian; W. J. Stark, representing the Horse Breeders' Association of Edmonton; and E. D. Adams, representing the Horse Breeders' Association of Calgary. The following have been appointed inspectors: No. 1, A. G. Eadie, of the Department of Agriculture, and Dr. Hayworth of Camrose; No. 2, W. R. Lowes, Edmonton, and Dr. Moon of Vermilion; No. 3, Jas. Clements, Department of Agriculture, with the accompanying veterinary to be appointed later.

The horses inspected are put into four classes, three of which are for pure-bred animals. The first includes animals of pure breeding, sound and good conformation; the second, pure of breeding, sound, but of type regarding conformation; the third, pure-breds, of good type, unsound, but fit for service; the fourth, sound grade stallions. Owners who do not have their horses inspected at the time that the officials are in their vicinity will be required to have them examined by the authorized inspectors at their own expense.

Inspection commenced on January 2nd and will not be completed till the middle of April.

HEAD OF THREE AGRICULTURAL SCHOOLS APPOINTED

MR. A. E. Meyer has been appointed the official head of the three schools of Agriculture with headquarters at Edmonton. Heretofore the schools have been conducted as more or less official units, the heads being directly responsible to the Minister of Agriculture. Under the new arrangement the teaching of the three schools will be standardized. Mr. Meyer is an ex-student of Toronto University and a graduate of the Ann Arbor University of Michigan. He was for a number of years a breeder of pure bred stock at Guelph, Ontario. Since going to Alberta, three years ago, Mr. Meyer has been an instructor in Animal Husbandry at Olds and has been associated with Mr. S. G. Carlyle in the superintendency of the Provincial Demonstration Farms.

PART III
Elementary Agriculture

BOYS' AND GIRLS' PIG CLUBS

Ambitious hopes are entertained for the work of boys' and girls' clubs. Whether concerned with the raising of pigs, poultry, calves, or other things, the movement is calculated to foster initiative and leadership and to rivet to the soil the sympathy of the rising generation. A competitive enterprise inspired by a sense of proprietorshuip turns a task into a joyous recreation. Boys' and girls' club work belongs to a class of extension work that has arisen largely from the Smith-Lever Bill in the United States and The Agricultural Instruction Act in Canada. It has so appealed to business men as to gain their moral and financial support. Under The Agricultural Instruction Act more than **$30,000** is set aside for boys' and girls' competitive activities in Canada this year.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

REALIZING that the swine industry of the province was not developing as it might, and also realizing that the boys were most likely to take a keen interest, the Department of Agriculture decided to form "Boys' Pig Clubs" in every county. Immediately the information spread, there were requests from several sections that clubs be formed, but it was decided to organize two only last fall and arrange for the balance in the spring, because supplying young pigs to boys in the fall is rather risky, due to the long winter when exercise becomes a serious question. The boys were not prepared to purchase the pigs outright, consequently the sections where the clubs are in existence were canvassed very carefully, and ten of the most promising boys chosen, who agreed to the rules laid down by the Department. They organized under definite names, and elected officers. Several of the older men became very much interested and honorary officers were appointed, who will undoubtedly offer assistance where required.

Community breeding is one of the principal ideas to be guarded; every club will adopt one of the bacon types of hogs and agree to register all progeny used for breeding purposes. In this way there will soon be an ample supply of high-class breeding hogs throughout the province, and the general quality of hogs marketed should be of a high order.

CONSTITUTION

A. THE NAME OF THIS CLUB SHALL BE:—
THE..............................

B. THE AIMS OF THIS CLUB SHALL BE:—
1. To increase bacon production in New Brunswick.
2. To improve the native stock of the province.
3. To develop this district into a community breeding centre, that is, a single breed for this district.

4. To study bacon type, practice better feeding and housing methods and to learn the value of selection when purchasing a pure-bred sire or dam.
5. To become proficient in judging bacon hogs.
6. To hold a Boys' Pig Club fair once a year.
7. To study marketing problems, such as: the standard weight of a bacon hog, the proper time to market hogs, the proper way to market them.
8. To register all animals kept for breeding purposes.
9. To study all the available literature on bacon production.

C. THE OFFICERS OF THIS CLUB SHALL CONSIST OF:—

1. A president, vice-president, a secretary-treasurer and an honorary president and vice-president.
2. Officers shall be elected for a period of one year and shall continue to hold office until new officers have been elected.

D. THE DUTIES OF THE OFFICERS:—

1. The president shall preside at all club meetings, he shall keep himself posted on all club affairs, at club meetings he shall introduce the speakers, in the case of selection of officers he shall not have a vote, except when there is a tie. Then he may vote.
2. The vice-president occupies the chair in the absence of the president and carries out the duties outlined for the president in clause D, paragraph 1.
3. The secretary-treasurer keeps the records of the club and also attends to financial affairs. The secretary-treasurer, when called upon by the president, reads the minutes of the last meeting. He shall be provided with a book upon which to record all meetings of the club and to record all moneys deposited with him. He shall be in a position to give a statement at any time and will look after the club correspondence.

E. THE RULES OF THIS CLUB SHALL BE:—

1. Club members must agree to one breed.
2. A Club must have at least ten members.
3. Boys between the ages of twelve and eighteen years may become members of a Boys' Pig Club.
4. No boy can join a pig club unless he has the consent of his parent or guardian.
5. Boys cannot join a pig club unless they have the proper facilities to care for and house the pig. They must also have feed available. It is not advisable for a boy to join a club unless he can obtain a certain amount of milk for his pig.
6. No club will be allowed to select a breed other than one of the recognized bacon breeds. This means that the Yorkshire and Tamworth will in the main be the breed chosen. The Chester White and Berkshire are known as fat hogs. There is, however rapidly developing what is known as the bacon type of Berkshire and Chester White. The Agricultural Department has no objection to clubs selecting either of these breeds, providing they conform to the bacon type.
7. It is imperative that one member of the club should maintain a pure-bred male animal for breeding purposes. Thus members of a club would be assured of an opportunity to get their sows in pig. The person maintaining the male animal to charge a service fee sufficient to pay him for his trouble, which rate would be $1.50 up to fifteen pigs, $1.00 for sixteen pigs and over, all non-members to be charged $1.50 with guarantee of castration if pigs bred are not pure-bred. Should a non-member in the vicinity have a desirable sire the club members can breed to same after first having received the consent of the Department of Agriculture and no male to be considered fit for service until it is........months old. No female to be bred until it is........ months old.
8. The club must hold an annual pig fair in the fall of each year. The date selected subject to the approval of the Department of Agriculture. Whenever possible the club pig fair shall be held on the same date as the local fair of the district.
9. All members of the club must show their pigs at the club fair.
10. A membership fee of twenty-five cents shall be paid to the treasurer of the club by each member at the time of joining. This money to be devoted to carrying on the business of the club.
11. The annual meetings will be held on the 1st Monday in January, when the officers for the ensuing year will be elected by ballot. Club meetings are to be held regularly every two months on the first Monday of the

following months: — January, March, May, July, September, November.

12. Special meetings may be called by the president at any time to transact important business.
13. The secretary-treasurer shall notify the members when a special meeting is to be called.
14. Once a year or oftener the Agricultural Department will send a representative to discuss problems, etc., with the club.
15. The Live Stock Division of the Department of Agriculture will supply the president of the club with papers on bacon production which shall be read at the regular meetings by members of the club.

THE PLAN OF OPERATION

The Department was prepared to buy the pigs if necessary, but sufficient wealthy, public-spirited men have become interested and see the possibilities, and they have so far supplied the pigs, and one firm has offered to stand behind a club in every county, but this will not be necessary, because residents in each county are prepared to do this. The boys agree to give back two pigs, one out of each of the first two litters, which will be used to form other clubs. When a number are formed the equivalent, in money, or pigs, can be returned to the donor, if necessary, thus making it a loan rather than a gift, which enables boys to become actual owners of live stock. Confidence is placed in the boy, and he is made to feel that an honest effort is his part of the contract.

One of the rules is that the pigs shall be exhibited at the local fall fair if possible, and if there is no such exhibition then a pig club fair will be arranged.

Throughout the season the boys will be visited by members of the Live Stock Division as often as necessary to promote success.

CONTRACT

This contract made and entered into by and between.......................... party of the first part, and.............. ....party of the second part, both of the county of.................and province of New Brunswick.

Witnesseth:—That the party of the second part has this day secured from the party of the first part one registered...... ....sow which he agrees to take possession of and treat in the most careful manner. That the second party also agrees at the same time to become a member of the....................Boys' Pig Club and binds himself to abide by the rules and regulations for the government of the club for two years to the best of his ability, and will when called upon, exhibit his sow at the club pig show and return a complete record to the Live Stock Division of the Department of Agriculture according to the provisions found in the record sheet furnished him.

He further agrees to breed the sow in the fall of the first year to a pure-bred boar of the same breed as the sow, approved by the Live Stock Division. In payment for the original sow, he will deliver to party of the first part two choice females not less than six weeks of age in good health. One of these to come from the first spring litter and the second from the second spring litter. The second party further agrees to register all of the female progeny from the original sow for a period of two years, and also all males that are sold entire for breeding purposes. If the original sow should die before producing any progeny the party of the first part shall sustain the loss.

If for any reason either party shall fail to fulfill this contract or any part thereof, he shall forfeit all rights to the sow and any progeny therefrom.

In testimony whereof the parties have hereunto set their hands this the .... day of......................191

....
Party of the First Part.

....
Party of the Second Part.

I hereby consent that Party of the Second Part may enter into the above contract.

......................Parent or Guardian
......................191

Disappointment was carefully guarded against by particular supervision from Mr. Thomas Hetherington, B.S.A., who had charge and planned the work; he interviewed all parties interested, and carefully selected the pigs. He is directing the feeding operations and assisting them to secure the best available literature upon bacon production.

NOTE.—In Part IV of this number of THE AGRICULTURAL GAZETTE there appears two forms of contract commonly used in boys' and girls' pig clubs in the United States.
—EDITOR.

MANITOBA

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

PIG-raising has been part of Boys' and Girls' Club work in Manitoba for the past five years, but it was not until two years ago that it really came into its own. In that year eight or nine managers of the Bank of Commerce who had taken considerable interest in club work, were persuaded to act as organizers or supervisors of the clubs in their vicinity.

Pig-raising naturally appealed to them as being particularly adapted to club work, and, although young pigs were very scarce, they set about finding out where they could be procured, with the result that each of these clubs was able to muster between 15 and 20 pigs, while Virden and Dauphin each had 66.

In a considerable number of cases the bankers loaned money to the children to buy their pigs, the amount needed generally being $8.00 for a pair of pigs, the security asked being a note signed by the boy or girl getting the money and a promise to show the pigs at the school fair. As the children were not of age, the banker asked the parent or guardian to sign the following agreement:—

........................191....
$............

On............after date I promise to to pay The Canadian Bank of Commerce at its office in.................the sum of...............Dollars, with interest at the rate of eight per cent, per annum as well after as before maturity. Value received.

....

The undersigned promises and agrees to maintain a membership in the........... Boys' and Girls' Club and conform to the rules and regulations of the said Club, to invest the amount represented by the promissory note at the head of this agreement in.................., and to care for same under the direction of the Club representatives. The undersigned also agrees to repay to the Bank at maturity the said amount out of proceeds of sale of original stock or increase.

(Borrower's signature)...............

I hereby consent to above contract, and agree not to claim any interest or right in the..........purchased, their increase, or proceeds of sale of same.

(Parent's signature).................

The same general plan was followed last year with more than double the number of entries, the cost of six-weeks-old pigs this year being generally $10.00. The banks report every member as being able to meet his obligation when it fell due. Very often the parent entered into the spirit of the game and handed over to the banker a sufficient amount to buy the pigs, and the banker loaned the money to the boy in the regular way. In some cases the agricultural society loaned the money and in a considerable number of cases the club member invested his own money.

In some clubs an extra charge of 25 cents was made and the pigs insured, but we have not heard of any cases of pigs dying.

PRIZES AND METHODS

In Manitoba there has never been much difficulty in securing prizes, provided the contests are honestly conducted, and we are firmly convinced that unless the boy or girl purchases the pigs either from his parents or some other person, and commences feeding them as soon as they are weaned, and continues taking care of them until they are six months old, the pig-raising contest is not producing the best results, and that two months does not allow sufficient time for a boy or girl to demonstrate his superiority in feeding pigs. Pigs make their most profitable gains during the first six months, consequently, the contestant needs to plan ahead for the most prafitable feed at different periods during the four and a half months of actual feeding.

Many farmers are feeding hogs at a loss, consequently, each contestant is required to keep an accurate record of all feeds, and if possible to weigh the pigs once a month in order to determine when the greatest gains are made.

HONESTY THE ONLY POLICY

In Manitoba we have endeavoured to take every precaution against dishonesty, but occasionally some one gets ahead of us. The average boy is a good sport and does not mind being fairly beaten, but loses interest at once if he is beaten by dishonest means. For this reason we are insisting on all records being duly witnessed by disinterested persons.

A LONG PRIZE LIST ADVISABLE

Another point that makes for success is a good long prize list, whether the first prize is large or not. At one fair as many as twenty prizes were offered in the one class, and the delight of the little fellow who won twentieth place was really good to see. He remarked that he had no idea he could win a prize. From an educational standpoint it is a big advantage, for were only three or four prizes offered none of the exhibitors coming between fourth and the lowest would have any idea as to where they actually stood in the contest.

In order to encourage the children the prize list should be so framed that every child who puts forth a real effort and does his best will win a prize, even if it is only a ribbon.

Prizes have often been decribed as being an unworthy incentive to effort. There are few people who ever get anywhere who are not striving after some prize or distinction, and rightly so. We have never noticed much difference in the effort put forth by the children when the first prize was $10 and where it was only $1.

GIRLS ALSO COMPETE

Although we have twelve contests, some particularly suited to boys, and others planned especially for girls, there are no limitations, and the winner of the pig-raising contest is often a girl, and occasionally a boy carries off highest honours in cooking or canning.

At Rivers this year one of the brightest girls in the neighbourhood exhibited a pair of Yorkshire pigs exactly six months old that weighed 500 pounds and were sold for $80.00 on the day of the fair. One of the judges declared they were pink pigs, but evidently cleanliness had something to do with the rapid growth made. This little girl was only thirteen, but she was able to answer any question asked her in regard to those two pigs, and there was not the slightest doubt in anyone's mind as to who fed them.

HOW MANY SHOULD A CHILD CARE FOR?

Where children who take part in the pig-raising contest are under eighteen, the contest should not extend over too long a period, nor should the number of pigs fed be so large as to weary the contestant. Two pigs are about as many as a boy can finance without undue assistance, hence, we intend to continue with that number for the present. Where a boy is allowed to feed six pigs belonging to his parents, and then show the two best at the fair, it is not a real contest, nor does the boy get as much good from it as if he has two pigs of his own. It should not be a case of "Johnnie's pig and Daddie's pork." That is what is driving boys and girls from the farms.

THE REPORT REQUIRED

A sample of the report required is herewith given:—

MANITOBA BOYS' AND GIRLS' CLUBS

PIG, CALF OR COLT RAISING RECORD, 1917

Report of........ ....
Exhibitor Age Post Office
School: Central Club:
1. Kind of animal chosen...............
2. Breed........Colour.... Sex........
3. Date animals were born.............
4. From whom obtained......Cost......
5. Weight when you acquired possession ....
Witness..................
6. Intermediate weighings:—
......June......lb. ......July....lb.
Date Date
......August...............lb.
Date
7. Record of feed and its cost:— $ cts.
New milk....quarts at 3c per qt.....
Skim milk....quarts at 1c per qt.....
Chop........... lb. at 1¼c per lb...
Shorts........... lb. at 1¼c per lb...
Other grains..... lb. at 1¼c per lb...
Cut green feed......at $3.00 per ton...
Pasture on basis of 1c per pig per day..............
Total cost of feed for........... weeks................
8. Original cost of pig (or calf or colt).... ....
9. Value of labour....................
10. Weight of pigs (or calf or colt) on Fair day.......................
11. Total gain during......weeks........
12. Value of pigs (or calf or colt) on Fair day at............c per lb........
13. Net profit.........................
Certified correct.................
Teacher or Organizer

ALBERTA

A PLEASING feature in connection with a recent show and sale was the pig-feeding competition for boys and girls under 17 years of age, the conditions requiring that the competitors should have been in entire charge of the pig since June 1, and the awards were based on the average gain and the best evidence of care and attention. The prizes and winners were as follows:—

First prize—$15 and championship: Robert Ball, West Salisbury, aged 16.

Second prize—$12 and reserve championship: Verna Bacon, North Edmonton, aged 11.

Third prize—$10: Leslie Ball, Lougheed, aged 10.

Fourth prize—$8: Constance Ball, Lougheed, aged 12.

Fifth prize—$6: Roy Bacon, North Edmonton, aged 14.

Sixth prize—$5: John H. Pearse, Edmonton, aged 15.

Seventh prize—$4: Oliver Bell, Horse Hills, aged 11.

Eighth prize—$3: George Jackson, Leduc, aged 15.

The pigs entered in this contest were decidedly high-class, and a company of packers, influenced, no doubt, by a wish to encourage the boys and girls in such practical and praiseworthy pursuits, paid a high price per pound for all the pigs which the competitors wished to dispose of.

Working in intimate and sympathetic relation with rural people, the county agent (Agricultural Representative) is able to secure the application of scientific knowledge and discoveries to the business of the farmer and the home life of country prople. In the present war he has been ready to meet the emergency and to concentrate all rural forces and organizations in working out the great problems of food production and food conservation. In recognition of his value as a local leader, Congress has provided funds for the immediate extension of this system to every agricultural county in the United States. State and county councils of defence and all rural organizations can do a patriotic public service by assisting the Government and the State in accomplishing this end.—*D. F. Houston, Secretary, United States Department of Agriculture.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

A KHAKI UNIVERSITY FOR CANADIAN SOLDIERS

THE following extracts are taken from a paper by Dr. H. M. Tory, President of the University of Alberta, read before the annual meeting of the Commission of Conservation:—

> While the day for demobilization may be far off, yet it should be thought about and plans should be made for that time. From the point of view of the soldier this will be the most critical period in the whole history of our army.
>
> AN AGRICULTURAL COLLEGE
>
> In this college I would offer the equivalent of a full year's work as set forth in the calendars of our agricultural schools in Canada. I firmly believe that 5,000 to 10,000 men could be got together to study agricultural problems under such conditions. I would include the following subjects: "Animal Husbandry," "Field Husbandry," "Dairying," "Farm Mechanics," "Operation of Tractors and Motors," and, if possible, "Elementary Chemistry and Physics."
>
> As I have previously stated, in a group of 200 men to whom I spoke about this matter, 57 definitely gave their names as being willing, first, to attend such a course; secondly, to remove from their own units for the purpose of getting the course, and many of them agreed to remain behind, if their units were sent home, for the purpose of finishing such a course.
>
> AN EXTENSION DEPARTMENT
>
> The Extension Department could be organized on a basis similar to that existing in some of our modern universities. The aim would be the organization of lecture courses in every camp, which would be accessible to every soldier. It would be administered from the University centre and would use the very best men obtainable in England and Canada. . . . Further, short courses in agriculture along the lines now in operation in short course schools in Canada could be organized in all the camps among the men who did not care to attend a fixed curriculum. As there are said to be over forty thousand farmers in the army, the significance of such work could hardly be over-estimated.
>
> THE LOCATION
>
> If it were possible to get the military authorities to set aside one camp in England, and to bring all the men who wish to take intensive educational work to that camp, that is the work described under all the departments above except the Extension Department, it would greatly facilitate matters.
>
> THE STAFF
>
> In carrying out the plan a large staff of men would be necessary. . . . All the universities of Canada have given quite largely of their staffs to the army and in addition high school teachers, business college instructors, and graduates of agricultural schools are scattered everywhere through the army. It would enormously diminish the difficulties of the plan if the military authorities would place at the disposal of the teaching organization such men of the above standing as were willing to serve...... I am confident that every university in Canada would be willing to share its teaching powers with the Khaki University to help in the emergency.
>
> THE EQUIPMENT
>
> In agricultural equipment, machinery could be obtained I have no doubt from the agricultural implement companies, who would, I think, regard the advertisement as worth the effort involved.

FORMS OF CONTRACT FOR PIG CLUBS

PIG Clubs, as conducted for boys and girls in Canada, are discussed in Part III of this number. They have for several years been operated on a large scale in many parts of the United States. The Department of Agriculture at Washington has suggested two forms of contract. One is termed "The Promissory Note Plan", and the other, "The Endless Chain Plan." Following is a copy of each of these plans:—

PROMISSORY NOTE PLAN

........................19.....

One year after date, for value received, I promise to pay to the order of...............................
$........, with interest at six per cent per annum.
......................................County Pig Club Plan Contract.

It is hereby agreed by and between.., party of the first part, and..................................party of the second part, that the party of the first part lend to the party of the second part $........... at six per cent interest, principal and interest payable one year after date. The party of the second part agrees to maintain a membership in the Pig Club conducted by the Extension Division of the State Agricultural College of ...., and the United States Department of Agriculture, and conform to the rules and regulations of the club and invest said $.............. under the direction of the county club representatives. Party of the second part also agrees to repay said loan at maturity out of proceeds of sale of original stock of increase.

Signed..............................

I hereby consent to above contract, and agree not to claim any interest or right in pigs purchased or their proceeds, which may accrue to the party of the second part.

Parent's Signature....................

"ENDLESS CHAIN" CONTRACT

This contract made and entered into this.......... day of.................... 19...., between........ ...., party of the first part, and.............................. party of the second part, both of the county of............. and state of.................................

WITNESSETH:

1. That the party of the first part agrees to furnish to the party of the second part, without cost, a registered sow pig.

2. The party of the second part agrees to receive the pig mentioned, to join the...................Pig Club, to abide by its rules and regulations to feed and care for the sow according to the instructions furnished to the members, and to make all reports required to Pig Club members.

3. It is further agreed that the party of the second part will breed the sow when not less than eight months of age to a registered boar of the same breed, and to raise the resulting litter under the same rules and regulations applicable to the raising of the sow.

4. It is further agreed that the party of the second part will deliver two choice gilts (not less than eight weeks old) from the first litter of pigs to the party of the first part in payment for the original sow.

5. It is further agreed that the party of the second part will take out registration papers for all of the pigs of the first litter unless disposed of for immediate slaughter.

6. It is further agreed by the party of the first part that when the conditions of this contract have been complied with by the party of the second part the original sow mentioned, together with all her increase not otherwise provided for in this contract, shall become the personal property of the party of the second part.

7. It is further agreed that in case there should not be two sow pigs raised and given to the party of the first part from the first litter this contract shall extend to the second litter, or until the terms of this contract are complied with.

8. In the event of the death of the original sow before farrowing a live, healthy litter the party of the first part will bear the loss.

8. In the event of the death of the original sow before farrowing a live, healthy litter the party of the first part will bear the loss.

9. If for any reason the party of the second part is unable to carry out the provisions of this contract, or willfully violates them, he shall forfeit all rights to the sow and progeny therefrom.

In testimony whereof the parties have hereunto set their hands this........day of..................... 19........

Signed...............................
Party of the First Part.

....
Club Member,
Party of the Second Part.

I hereby consent to the conditions of the above contract. It is further understood that the sow, all her increase, not otherwise provided for in this contract, or any proceeds therefrom, will remain the exclusive possession of the party of the second part.

Signed...............................
Parent or Guardian.

THE MEANING OF PEDIGREED SEED

BY L. H. NEWMAN, SECRETARY OF THE CANADIAN SEED GROWERS' ASSOCIATION

Before discussing the value of what is known as "Pedigreed" seed, it might be well to determine the meaning of this class of seed.

When we speak of pedigreed seed we have in mind seed whose exact history is known. All seed, like all other living things, has a pedigree, that is, it has its own particular line of ancestors, but these are not always known. When an animal or plant is "pedigreed," we understand that the ancestry is known and that it contains "blood" which is usually of known value. In seed, as in living stock, the ruling principle is that "like tends to produce like," as a result of which it is of the greatest importance that the seed or the animal used be of the very best both in quality and "breeding."

HYBRIDIZATION AND SELECTION

In Canada a good deal of attention has been given during the past ten or fifteen years to producing strains of our leading cultivated plants which combine to a high degree the more important industrial qualities. Two methods have been used, namely, *hybridization followed by selection*, and *selection* alone. The work of hybridization being a highly technical work is confined almost exclusively to experimental stations, where trained men are available. Straight selection work without hybridization is carried on to a considerable extent throughout Canada by members of the Canadian Seed Growers' Association on their own farms. When these men first started to select, some seventeen years ago, most of the varieties they worked with were composite in character, that is, they were made up of strains of varying practical values. By continuously selecting for a certain type many of these men have effected definite improvements. The application of selection work to such crops as potatoes and corn, which are constantly varying, has proven of decided value. In the case of cereals which ordinarily self-fertilize, the value of continuous selection is very considerably minimized, especially where the grower starts with what is known as a pure line, that is, with a strain of seed which has come from a single fixed plant. Even here, however, selection has shown its value in helping to maintain the purity and vigour of the type.

WORK OF THE ASSOCIATION

The propagation of pure strains throughout the country is carried on largely by members of the Canadian Seed Growers' Association. Nowadays the foundation stock obtained by each new member is secured either from another member of the Association or from an Experimental Station. The member then applies a certain system of selection to the seed produced. His crops are inspected by an expert during the growing season and a detailed report on the same submitted to the Secretary of the Association at its headquarters at Ottawa. When the grower has a quantity of seed to sell, samples are sent to Ottawa for examination and testing. If the samples comply with certain standards as regards germination, purity and quality, the seed may be catalogued for sale under the name of "Registered Seed." This term is, therefore, synonymous with "Pedigreed Seed," and is the name under which this class of seed is now officially known in Canada.

SUPERIORITY OF REGISTERED SEED

As to the exact value of "Registered Seed," experiments have been conducted at a number of stations to compare this class of seed with ordinary seed of the same variety, and in practically all cases "Registered Seed" has proven its superiority. A great many farmers have also tested out "Registered Seed" in comparison with ordinary seed on their own farms and have spoken in the highest terms of the former. In 1912, for instance, comparison was made between Registered and Non-Registered Banner by 30 farmers. In this test "Registered Seed" averaged 7.5 bushels per acre more than did the Non-Registered. It also weighed 5.2 pounds per bushel more than the latter. The majority of the farmers also commented specially on the speriority of "Registered Seed" as regards uniformity of growth and maturity.

INSPECTION A GUARANTEE

All seed offered for sale as "Registered Seed" must be inspected in the sack by an expert, who compares the seed offered with a part of the sample which has been sent to headquarters for approval. If the seed in the sacks is representative of the sample, the inspector has the sacks sewn up in his presence, after which he attaches a certificate tag and a metallic seal. The seed so inspected and sealed is now ready for shipping, and may go through any number of hands and still retain its identity.

Catalogues containing the names of the growers having such seed to sell are printed by the Association and distributed widely, so that growers of this class of seed receive wide publicity for their offerings. Our leading seed houses are coming to be the biggest buyers of "Registered Seed," as they find there is a growing demand throughout the country for the very best class of seed available.

Farmers are becoming educated as to the value of "Registered Seed," and many do not object to paying a good price for it because they have a pretty definite assurance that the seed they are getting is all that they expect it to be. The demand for "Registered Seed" is increasing more rapidly than is the supply, and special efforts are being put forth to increase its production.

THE FEDERAL GOVERNMENT GRANT

The work which the Association is doing throughout Canada is made possible by a Federal Government grant which comes through the Seed Branch of the Department of Agriculture. Formerly this work was directly under Departmental supervision, but later it was thought advisable to have the members form themselves into an association and work independently of direct Governmental control. The work which the Association is doing may be regarded as an extension of the work of the Seed Branch and of the Experimental Stations, a fact which clearly justifies the relatively small expenditure necessary to carry on the work on this basis.

CONVENTION ON WHITE PINE BLISTER RUST

A CONVENTION recently held on White Pine Blister Rust at Pittsburg, Pa., was attended by Mr. W. A. McCubbin of the Division of Botany, of the Dominion Experimental Farms. It was shown that the disease was far more common in the eastern states and Ontario and Quebec than in other sections of the North American continent. It was stated that reports from Ontario indicated that infection is very general throughout the province. Disease was found during the summer by scouts and by a campaign carried out in the public schools. Currant rust was found to be present in 38 counties out of 42. In several cases the rust occurred far to the north, well within the pine area. In Quebec a number of scattered infections were found, but there are no records of any disease in Nova Scotia, New Brunswick or Prince Edward Island. No inspection has been made in the northern part of Ontario, the Prairie Provinces or British Columbia.

Committees were appointed to consider the situation and to make recommendations on the problem involved. A unanimous desire was expressed that Canada should co-operate with the United States in the matter. Some of the delegates urged that a general quarantine should be established prohibiting the importation of nursery stock to the United States.

ASSOCIATIONS AND SOCIETIES

THE MONTH'S MEETINGS

Interprovincial Butter Show and Dairy Convention, Winnipeg	Jan. 31 & Feb. 1
Dominion Breeders' Association Meetings, Toronto	Feb. 5-8
British Columbia Dairymen's Convention, Chilliwack, B.C.	Feb. 6 & 7
Provincial Seed Grain Fair, Winnipeg, Man	Feb. 11-23
Ontario Corn Show, Chatham, Ont	Feb. 12-14
Saskatchewan Grain Growers, Regina, Sask	Feb. 12-15
Manitoba, Bee-keepers' Association, Winnipeg	Feb. 19-22
Manitoba Home Economics Societies' Convention, Winnipeg, Man	Feb. 19-21
Manitoba Soil Products Fair, Winnipeg, Man	Feb. 19-22
Manitoba Potato Conference, Winnipeg, Man	Feb. 20
Alberta Provincial Dairy Convention, Edmonton, Alta	Feb. 20-21
Manitoba Agricultural Societies' Convention	Feb. 20-22
Manitoba Horticultural Societies' Convention	Feb. 21-22
Good Roads Conference, Toronto	Feb. 25-28

The Manitoba Winter Fair will be held at Brandon on March 4-9; the Spring Horse Show and Bull Fair at Calgary on March 26-29; and the Edmonton Spring Horse Show and Fat Stock Show at Edmonton, April 2-6.

THE CANADIAN NATIONAL LIVE STOCK RECORDS

The following table gives the number of pedigrees and transfers recorded by the Canadian National Live Stock Records Board of different breeds and classes of horses, cattle, sheep and swine for the five years 1913 to 1917, inclusive, and of Brown Swiss cattle and dogs for 1915, 1916 and 1917:—

ASSOCIATION	Pedigrees Recorded					Transfers Recorded				
	1913	1914	1915	1916	1917	1913	1914	1915	1916	1917
Aberdeen Angus	1010	1541	1255	1431	2567	652	761	797	1103	1448
Ayrshire	3629	3496	3682	4000	4368	1418	1364	1407	1976	3205
Belgian	106	132	76	131	241	92	83	96	94	169
Brown Swiss	....	....	432	270	57	....	....	4	23	25
Clydesdale	3678	2900	2555	3132	3885	3616	2773	2255	3266	3715
Dogs	....	....	877	1542	1661	....	....	183	1224	1428
Canadian Cattle	341	338	319	268	327	86	117	124	141	199
French Coach	6	19	10	7	2	8	5	14	10	5
Canadian Horse	96	53	85	64	52	24	15	51	30	23
Galloway	23	91	63	30	19	6	7	22	45	6
Goats	....	....	....	....	....	....	....	....	....	....
Guernsey	87	154	230	146	183	48	35	39	88	55
Hackney	167	101	128	94	77	162	129	142	132	123
Hereford	1820	2543	2147	3207	5353	634	869	769	1087	1971
Jersey	1135	1215	1065	1308	1703	675	732	887	1014	1151
Percheron	1560	962	825	1323	2304	556	486	493	642	913
Pony	329	228	67	69	40	15	25	31	32	25
Red Polled	459	102	80	477	331	24	37	45	52	94
Sheep	3934	4826	6019	7958	8411	645	1372	1376	2509	3874
Shire	274	135	93	121	158	149	93	79	107	149
Shorthorn	9173	10186	11135	14333	16863	3647	5813	5063	6987	9414
Standard Bred	560	361	319	382	324	93	164	157	192	164
Suffolk	86	31	35	28	34	18	29	13	32	37
Swine	11509	14441	9718	13594	12204	1231	1916	1507	3493	9270
Thoroughbred	313	194	219	151	158	70	69	59	91	89
Totals	40295	44049	41434	54066	61322	13869	16894	15613	24370	37552

MEMBERSHIP OF LIVE STOCK ASSOCIATIONS

The following table shows the membership of the different associations represented in the National Live Stock Records Board in 1917:—

ASSOCIATION	Ont.	Man.	Sask.	Alta.	B.C.	Que.	N.B.	N.S.	P.E.I.	U.S.	G.B.	Total
Aberdeen Angus	130	64	70	85	3	5	......	1	......	4	1	363
Ayrshire	430	34	40	79	34	753	54	64	29	14	......	1531
Belgian	2	5	32	21	......	22	......	......	......	1	......	83
Brown Swiss	3	......	1	......	......	10	......	1	......	......	......	15
Clydesdale	1449	392	348	204	38	75	12	17	16	11	2	2564
Kennel	573	83	64	58	136	123	19	9	2	22	......	1089
Canadian Cattle	2	1	......	......	......	167	1	......	......	......	......	171
French Coach	......	......	3	10	......	......	......	......	......	......	......	13
French Canadian Horse	1	1	......	......	......	158	......	......	......	......	1	161
Galloway	6	7	2	7	......	......	......	......	......	......	......	22
Goat	1	1	......	2	16	......	1	......	......	......	......	21
Guernsey	6	1	......	......	11	9	6	35	4	......	......	72
Hackney	84	9	12	21	12	14	1	2	1	8	1	165
Hereford	167	66	90	133	6	4	5	1	17	......	......	489
Jersey Cattle	210	18	24	23	65	56	20	24	5	1	1	447
Percheron Horse	93	60	153	180	6	12	3	2	1	7	......	517
Pony	40	3	7	7	3	6	......	......	......	......	......	66
Red Polled	....	19	19	11	8	......	......	1	......	......	......	58
Sheep	367	54	71	94	20	388	21	25	23	9	......	1072
Shire	39	11	14	29	5	2	1	......	......	1	......	102
Shorthorn	1668	368	296	336	17	96	23	44	19	5	......	2872
Standard Bred	97	16	42	37	12	18	2	2	2	2	......	230
Suffolk Horse	1	1	4	16	......	......	......	......	......	......	......	22
Swine	400	156	340	333	54	385	23	20	16	3	......	1730
Thoroughbred Horse	85	5	9	27	9	10	......	......	......	......	......	145
Totals	5844	1375	1651	1713	455	2313	192	248	135	88	6	14020

PRINCE EDWARD ISLAND EGG AND POULTRY ASSOCIATION

The fourth annual meeting of the Prince Edward Island Egg and Poultry Association was held in Charlottetown on January 14th and 15th, 1918. Hon. Murdock MacKinnon, Provincial Commissioner for Agriculture, Mr. W. A. Brown, of the Poultry Division of the Live Stock Branch, Ottawa, and Mr. J. W. Mitchell, Assistant Commissioner under THE AGRICULTURAL INSTRUCTION ACT, took part in the proceedings. Last year's officers were re-elected, namely, President, Rev. P. P. Arsenault; first vice-president, Edward Bulpitt, Cardigan; second vice-president, J. B. Millman; third vice-president, A. Schurman, Central Bedeque; Secretary, Wm. Kerr, Charlottetown.

UNITED FARMERS OF ONTARIO

The United Farmers of Ontario met in their fourth annual convention at Toronto on December 19th and 20th, 1917. Many subjects came up for discussion, especially regarding the scarcity of labour and the campaign for increased production of hogs. Resolutions were passed asking for the removal of the duty from agricultural machinery, implements and clover seed; favouring the prohibition of the use of any grain for the making of alcoholic beverages during the progress of the war; asking the Railway Commission to have fertilizers in bulk put in the same class as crushed rock for carriage as freight; asking the Dominion Government to investigate the cost of making cheese and to make reports to the Imperial Government with a view to having the price arranged in accordance with the cost of production. It was decided to accept an invitation to extend the organization to Quebec. A committee was appointed to consider the advisability of publishing an official organ. In his report the secretary, Mr. J. J. Morrison, said that in the previous year 200 organizations were in affiliation with the United Farmers, comprising 8,000 members. At the present time there were 315 organizations and 12,000 members. The following officers were elected: President, R. H. Halbert; vice-president, E. C. Drury, Simcoe; secretary-treasurer, J. J. Morrison, Arthur, Ont.

ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION

THE 39th annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College on January 8th and 9th, 1918. The gathering was one of the largest and best the Union has held. Among the subjects discussed were: "Co-Operative Experiments in Agriculture" introduced by Dr. C. A. Zavitz; "Ontario Agriculture in the Present Crisis", introduced by Dr. G. C. Creelman; "Co-Operative Experiments and Eradication of Weeds," by Professor Howard; "Root Seed Production in Canada," by Dr. M. O. Malte, Dominion Agrostologist; "Northern Ontario as a Source of Seed Potatoes," by Mr. Justus Miller, Assistant Commissioner of Agriculture; "Co-operation in Wool Marketing," by Mr. R. W. Wade, Director of Provincial Live Stock Branch; "Field Crop Competitions," by Mr. J. Lockie Wilson, Superintendent of Agricultural Societies, and "Underdrainage and Tile Making," by Mr. J. R. Spry, Lecturer on Physics.

A symposium on the production of food materials for the present year was a feature participated in by Dr. C. A. Zavitz, who spoke on wheat and beans; Professor G. E. Day, on beef and bacon; Professor H. H. Dean, on butter and cheese; Professor W. R. Graham, on butter and eggs, and Mr. P. W. Hodgetts, Director of Fruit Branch, on fruit, vegetables and honey. Professor D. H. Jones addressed the gathering on the proposed co-operation of the Union with farmers in testing cattle for tuberculosis; Professor J. W. Squirrell referred to the objects of the Experimental Union; Mr. R. S. Duncan, Supervisor of Agricultural Representatives, to the work of that body; Mr. G. H. Clark, Dominion Seed Commissioner, to the activities of his branch, and Mr. L. H. Newman, secretary of the Canadian Seed Growers' Association, to the work of his organization.

The convention concluded with an address by Mr. S. C. Johnston, Chief of the Bureau of Motion Pictures, on what his division was aiming to do for Ontario agriculture. Mr. Johnston's address was followed by a series of motion picture illustrations of the bacon industry; mangel seed production; history of the Ontario Agricultural College No. 72 Oats; poultry raising; the canning of vegetables, etc.

The following officers were elected for the current year: President, Mr. H B.. Webster, R.R. No. 1, St. Marys; vice-president, Mr. P. S. McLaren, R.R. No. 2, Perth; secretary, Dr. C. A. Zavitz; assistant secretary, Professor W. J. Squirrell; Treasurer, Mr. A. W. Mason.

EASTERN ONTARIO DAIRYMEN'S ASSOCIATION

The forty-first annual convention of the Eastern Ontario Dairymen's Association was held at Perth on January 10th and 11th. There was a large attendance. Addresses were delivered: by Mr. J. M. Stone, President of the Association, who, in his opening remarks, referred to the many changes that had taken place in recent years and to the progress that dairying industries had made; by Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner for Canada, who detailed at some length the work of the cheese commission; by Mr. Jas. Alexander, Chairman of the Cheese Commission, who went into some particulars of the difficulties encountered in carrying out the work; by Mr. A. A. Ayer, "Montreal, on men, food and money;" by Professor H. H. Dean on "experiments in dairying;" by Mr. G. G. Publow, Chief Dairy Instructor for Eastern Ontario, who, in delivering his report, dealt with details regarding his work; by Professor J. H. Grisdale, Director of the Dominion Experimental Farms, who went into particulars regarding the necessity for increased production and briefly reviewed the difficulties of the situation; by Mr. Geo. H. Barr, Chief of the Dairy Division at Ottawa, who took for his subject "The Improvement of Dairy Herds;" by Mr. J. H. Scott, Official Grader of Butter, Toronto, on "the grading of butter by sample;" by Mr. L. A. Zufelt, Superintendent of the Dairy School, Kingston, who explained various difficulties that butter makers are labouring under; also by Dr. J. W. Robertson, Chairman of the Commission of Conservation, Mr. C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture for Ontario, Mr. W. J. Bell, B.S.A., Principal of Kemptville Agricultural School, Dr. A. Hanna, M.P., and others.

Resolutions were passed regarding the sale of oleomargarine, trusting that the restrictions under which the sale is permitted will be rigidly enforced, and relative to the price of cheese.

The officers elected were: President, R. G. Leggatt; 1st vice-president, J. McGrath; 2nd vice-president, Neil Fraser; treasurer, J. R. Anderson, Mountain View; secretary, T. A. Thompson, Almonte.

WESTERN ONTARIO DAIRY CONVENTION

The annual convention and exhibition of dairy products of the Western Ontario Dairymen's Associaion was held in Stratford on January 16th and 17th. In addition to the reports of officials concerning the condition of the industry, addresses were given by Mr. J. A. Ruddick, Dominion Dairy Commissioner, Dr. C. A. Zavitz and Professor H. H. Dean of the Ontario Agricultural College and others, on subjects vital to the industry. The value of the systematic grading of cream for buttermaking was emphasized by Mr. L. A. Gibson, Dairy Commissioner for Manitoba, who stated that it had done more than any other one thing to put the dairy industry of the Prairie Provinces on its feet. Ontario officials concurred in this opinion. Resolutions were adopted expressing sympathy with the system of grading butter adopted last year, also asking the Government at the conclusion of the war to rescind the order-in-council allowing the importation, manufacture and sale of oleomargarine. Mr. James Donaldson, Atwood, was elected president; Mr. F. Boyes, Dorchester, first vice-president; Mr. W. G. Meade, Winchelsea, second vice-president, and Mr. F. Herns, London, secretary-treasurer.

THE WESTERN ONTARIO POULTRY ASSOCIATION

At the annual meeting of the Western Ontario Poultry Association held in Guelph on Tuesday, December 4th, the following officers were elected: President, W. W. Simpson, Guelph; first vice-president, George Henderson, Hamilton; second vice president, A. E. Field-Marshall, Beamsville; secretary-treasurer, R. W. Wade, Toronto.

EASTERN ONTARIO POULTRY BREEDERS' ASSOCIATION

The Eastern Ontario Poultry Breeders' Association at the annual meeting elected the following officers: Hon. president, Hon. T. A. Crerar; president, Geo. Higman, jr.; first vice-president, A. W. E. Hellyer; second vice-president, Harry Carleton; secretary-treasurer, W. D. Jackson, Carp.

VACANT LOT GARDENING IN HAMILTON

Relative to the article on Vacant Lot Gardening, published in the December number of THE AGRICULTURAL GAZETTE, the secretary of the Hamilton Horticultural Society, Mrs. R. B. Potts, furnishes additional information of the work done by that society. She states that 2,500 pamphlets were distributed, dealing with garden work, the growing of vegetables, control of insect pests and the conservation and preservation of food, that many meetings were addressed by members, that encouragement was given to garden work by Italians and other foreigners, that attention was paid to the cultivation of plots around the convalescent homes, that assistance was rendered by inspection to the work of the community clubs on the Mountain, and that interest was taken in the conservation of bird life. The year 1917 was reported to have been the most progressive in the history of the society. This year it is intended to extend the vacant lot garden work and to have among other enterprises an Italian home-garden exhibition. Extension of mission work to the cultivation of the soil is to be encouraged. The society, and individual members of the society, offered prizes of definite value for vacant lot products at various exhibitions and local shows in 1917, and will do the same this year. The president of the society is Mr. John A. Webber; the first vice-president, Mr. Jas. Anderson; the second vice-president, Mr. John R. Thompson; the third vice-president, Rev. G. W. Tebbs; the treasurer, Mr. J. M. Robinson; the secretary, Mrs. R. B. M. Potts, and the associate secretary, Miss I. M. Walker.

THE MANITOBA GRAIN GROWERS' ASSOCIATION

The Manitoba Grain Growers' Association at its annual meeting held in Brandon, Man., on January 9th, 10th and 11th, 1918, passed resolutions among others, recommending that the Dominion Government unify the railroads in one system; deciding to petition the placing of farm machinery and implements on the free list; suggesting that the time had come for the complete mobilization of man power in the Dominion, including the closing of non-essential businesses and the drafting of men for farm work, that *bona fide* farmers and farm labourers be exempted from military service so long as they remain in such occupation, except in the case of large families who have made no voluntary contributions to the military forces of the Dominion, that all available men should immediately be reached with a view of placing them in positions where they may render most effective service to the nation, that a maximum wage be fixed for competent men and a minimum wage for boys and inexperienced men, that there should be an immediate registration of all engaged in the production of food stuffs, with a view of bringing together employer and employee, and that the relations of employer and employee be placed under the supervision of a competent authority appointed by the Government. This association, also by resolution, expressed itself in favour of the co-operative Hail Insurance Act now on the statute book of the province, and suggested that said Act should be submitted to the electors in June, 1918, with a view to bringing at least 25 municipalities under its provision. A motion was passed favouring a national convention of representatives of Canadian agriculture to deal with agricultural matters affecting the Dominion as a whole.

The officers elected were: President, R. C. Henders, Winnipeg; 1st vice-president, J. L. Brown, Pilot Mound; 2nd vice-president, Mrs. J. S. Wood, Oakville; secretary, W. R. Wood, M.L.A., Franklin.

MANITOBA CATTLE BREEDERS' ASSOCIATION

At the annual meeting of the Manitoba Cattle Breeders' Association, held at Brandon, January 8, 1918, the principal matter up for discussion was the report of the bull sale, when it was stated that in 1906, the year of the first sale, the average price was $84.87, whereas in 1917 the average was $247.81. A resolution was passed favouring an offering of selected females at future bull sales. The officers elected were: President, W. H. English, Harding, Man.; vice-president, Jas. E. Chapman, Hayfield, Man.; secretary, W. I. Smale, Brandon; who was absent from the meeting through illness.

A SHORTHORN CLUB FOR MANITOBA

The Shorthorn breeders of Manitoba met recently and formed a club with the following officers: Andrew Graham, Roland, president; J. G. Washington, Ninga, vice-president; J. B. Davidson, Myrtle, secretary.

MANITOBA WOMEN'S GRAIN GROWERS' ASSOCIATION

The Manitoba Grain Growers' Association at its annual meeting in Brandon on Jan. 10, 1918, having adopted a resolution approving the organization of a women's branch of the association, a meeting of women members was held and the following resolution passed:

> Whereas, we, the women members of the Grain Growers' Association of Manitoba, believe that the time has come when it is necessary and expedient for the farm women of Manitoba to have their own organization, and
>
> Whereas, it is believed that only as a separate section, can they further their educational, social, economical, political, and æsthetic interests in the way deemed necessary; and,
>
> Whereas, it is deemed imperative and expedient in the interests, and for the welfare of the Manitoba Grain Growers' Association, and of the farm women of Manitoba, that they continue in unison and co-operation and so preserve the unity of the association;
>
> Be it resolved that a woman section of the Manitoba Grain Growers' Association be formed; and be it further resolved that the constitution of the Manitoba Grain Growers' Association be amended to include these clauses:
>
> (1) Women shall have the same standing in the Association as men.

Clauses 2, 3, 4, 5 and 7 having dealt with the method of organization and governance, the resolution proceeded;

> (6) The objects of the women's section are those of the Association as a whole, and, particularly:
>
> (a) Better rural schools. (b) The development of local taste for finer things of life. (c) Wholesale recreation for old and young. (d) The promotion of better legislation—Dominion and Provincial. (e) Education of women in the duties of citizenship. (f) Strengthening of the Association.

The officers elected were: President, Mrs. J. S. Wood, Oakville; vice-president, Mrs. A. Tooth, Eli; secretary and director at large, Mrs. Jno. Ames, Winnipeg.

MANITOBA SHEEP BREEDERS' ASSOCIATION

The Manitoba Sheep Breeders' Association at the annual meeting held in Brandon on Jan. 9, 1918, elected Thos. Jasper, Harding, Man.; president, and W. R. Bowman, vice-president. W. I. Smale, Brandon, is secretary.

THE MANITOBA SWINE BREEDERS' ASSOCIATION

At the annual meeting of the Manitoba Swine Breeders' Association in Brandon on January 9th, the officers elected were: President, John Strachan, Pope, Man.; vice-president, David Agnew, Douglas; Man.; secretary, W. I. Smale, Brandon. A sale of sows is to be held during the spring stock show in March and a sale of pure-bred boars and sows during the time of the annual fall show.

THE SASKATCHEWAN'S DAIRYMEN S ASSOCIATION

The annual convention of the Saskatchewan Dairymen's Association was held at Saskatoon on January 9th and 10th. A new feature of this convention was the Stock Judging Competition for teams of three boys under twenty years of age. Owing to severe weather and to the scarcity of farm labour, only four teams took part in this competition. Unusual interest was taken in the better scoring competition for creamery men. Two groups of six samples representing various grades of butter were submitted for scoring. The men coming nearest to the judge's score of the twelve boxes were the winners of the prizes. Following is a summary of the more important resolutions adopted:—That this convention favours the organization of a federal dairymen's association; that strict supervision and control should be maintained over the manufacture and sale of oleomargarine; protesting against the raising of freight and passenger rates on the railways; suggesting that the Food Controller should control the production, price and distribution of bran, shorts and all commercial stock feeds and feed contributions; suggesting that a Federal Farm Products Standards law should be enacted; pledging the support and co-operation in the establishment of cold storage warehouses, creamery and dairy produce distributing systems, poultry feeding, packing and marketing stations and egg buying and shipping circles under the direction and management of the Saskatchewan Co-operative Creameries, expressing appreciation of assistance granted by the Federal Government for the establishment of cow-testing branches; favouring the better regulation, registration, selection and conscription of labour for the farm; relative to improved regulation of manufacturing establishments and firms engaged in dealing in food stuffs; urging that the sale of all cattle reacting from the tuberculin test be prohibited, and that the testing of herds be made compulsory. The officers elected were: President, A. H. Salmon, Kelso; vice-president, J. C. Moore, Fiske; secretary-treasurer, K. C. Mackay, Saskatoon.

SASKATCHEWAN LIVE STOCK ASSOCIATIONS

BY P. F. BREDT, SECRETARY

The annual meetings of the Saskatchewan live stock associations were held in Regina on January 3rd and 4th, and were well attended. A joint evening meeting took place on January 3rd, which was addressed by the Hon. W. R. Motherwell, Dean Rutherford of Saskatoon, and Prof. J. B. Reynolds, president of the Manitoba Agricultural College. Greater production and food conservation were the outstanding features of the addresses.

HORSE BREEDERS

Speakers:—Dr. Creamer on "Federal Aid to Horsebreeding"; F. H. Auld, Deputy Minister of Agriculture, on "The New Saskatchewan Horse Breeders' Act." A resolution was passed increasing the number of directors from three to twelve. Officers elected: President, A. Mutch, Lumsden; vice-president, Dr. Head, Regina; secretary, P. F. Bredt, Regina.

CATTLE BREEDERS

Speakers:—Dr. McGillivray of Winnipeg on "Prevention of Blackleg"; Dean Rutherford on "Problems of the Breeder". A resolution was passed that the Dominion Government authorities be urged to pass laws or regulations which shall effectively prevent the sale of all cattle which have reacted to the tuberculin test, except for immediate slaughter. The number of directors to be increased to six instead of three. Officers elected:—President, R. M. Douglas, Tantallon; vice-president, B. H. Thomson, Boharm; secretary, P. F. Bredt, Regina.

SHEEP BREEDERS

Speakers:—W. W. Thomson, on "Co-operative Wool Marketing"; Professor Tisdale, of Saskatoon, on "Improvement, Care and Handling of Wool". A resolution was passed to petition the Dominion Government not to place an embargo on the free marketing of wool. Officers elected:—President, H. H. Follett, Duval; vice-president, F. T. Skinner, Indian Head; secretary, P. F. Bredt, Regina.

SWINE BREEDERS

Speakers:—Professor J. B. Reynolds, of Winnipeg, and Professor A. M. Shaw, of Saskatoon, both dealing with "Greater Hog Production", and the problems which are incident thereto. Officers elected: President, P. Leech, Baring; vice-president, S. V. Tomecko, Lipton; secretary, P. F. Bredt, Regina.

ALBERTA WINTER FAIR, CALGARY

BY E. L. RICHARDSON, SECRETARY, ALBERTA LIVE STOCK ASSOCIATIONS

The Alberta Winter Fair which was held at Calgary, December 11th to 14th, 1917, was most successful. The attendance, number of animals shown, the quality of the exhibits, and the value of the sales made during the week, showed that great progress was being made. The outstanding feature of the show was the Baby Beef Competition for steers and heifers born in 1916 fed by boys and girls between the ages of nine and seventeen years. There were 53 entries, of which 44 were actually shown, namely, 22 heifers and 22 steers. Cash amounting to $1,790 and trophies to the value of $325 were awarded in this class alone. Fourteen prizes were offered for heifers and the same for steers. Several special classes were also organized. The competition was such a success that it will be continued for a number of years and other similar competitions held for other kinds of live stock.

ALBERTA WINTER FAIR, CALGARY, 1917, BABY BEEF COMPETITION

1st prize steer and champion, sold for 36c. per lb.

ALBERTA WINTER FAIR, CALGARY, 1917, BABY BEEF COMPETITION

1st prize animal sired by a Shorthorn, 2nd in steer class and reserve champion Baby Beef

There were 1,650 animals on exhibition and for sale, as against 1,172 the previous year, 659 in 1915 and 469 in 1914. In 1916 approximately $125,000 changed hands for live stock during the week, while in 1917 fully $242,000 was realized.

At the annual meeting of the Winter Fair Association the following officers were elected for 1918: President, W. F. Stevens, Provincial Live Stock Commissioner; vice-president, Wm. Sharpe, Lacombe, president of the Alberta Cattle Breeders' Association; secretary-treasurer, E. L. Richardson, Calgary.

ALBERTA WINTER FAIR, CALGARY, 1917, BABY BEEF COMPETITION
Class of 22 heifers as awards were made from left to right

ALBERTA SWINE BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Swine Breeders' Association, held at Calgary on December 11th, 1917, the following officers were elected: President, W. J. Hoover, Bittern Lake, Alta.; first vice-president, Steve Swift, Viking, Alta. second vice-president, E. J. C. Boake, Acme, Alta.; secretary-treasurer, E. L. Richardson, Calgary, Alta.

ALBERTA SHEEP BREEDERS' ASSOCIATION

At the annual meeting of the Alberta Sheep Breeders' Association held in Calgary on December 12th, the financial statement presented showed a turn-over of $103,000 for the year's business, including wool and sheep sales, and a balance of $789 to the credit of the association. It was decided to give every possible encouragement to the feeding and the care of sheep by boys and girls. Contributions were volunteered towards prizes for a class of Alberta-bred lambs, fed, cared for and exhibited by the young people. It is anticipated that at least $500 and perhaps $1,000 will be given in prizes in this connection. A boys' and girls' sheep shearing competition is also suggested to be held at the summer exhibition, and it is likely $150 to $200 will be offered in prizes. The following officers were elected: President, R. Knight, Calgary; first vice-president, H. S. Currie, Castor; second vice-president, Herbert Smith, Camrose; secretary-treasurer, E. L. Richardson, Calgary, Alta.

BRITISH COLUMBIA FRUIT GROWERS' ASSOCIATION

At the annual meeting of the British Columbia Fruit Growers' Association, held in Victoria, on January 17, the following officers were elected:—President, C. E. Barnes, Walachin; vice-president, J. E. Reekie, Kelowna; executive, Thomas Abriel, Nakusp; R. M. Palmer, Cowichan Bay; W. E. Chapple, Armstrong; L. E. Taylor, Kelowna; and secretary, Prof. F. M. Clement, of the University of British Columbia, Vancouver.

NEW BRUNSWICK POTATO GROWERS' ASSOCIATION

The third annual convention of the New Brunswick Potato Growers' Association was held at Woodstock, N.B., on January 24, when the following officers were elected: President, A. A. H. Margeson, East Florenceville; vice-president F. E. Henderson, Andover; secretary, A. C. Taylor, Woodstock; treasurer, W. H. Moore, Scotch Lake.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

Report of the Minister of Agriculture, for the year ending March 31, 1917. This Report, which is of the customery comprehensive character, covering synopses of the proceedings and operations, of all the departmental branches and divisions, along with appendices, giving the reports of the Director General of Public Health and the Commissioner of Exhibitions, makes a blue book of 134 pages. The Report also contains a record of the patents of invention issued, and of copyrights granted, with statistical tables covering the last eleven years.

THE HEALTH OF ANIMALS BRANCH

The Foisoning of Horses by the Common Bracken Fyeris Aquilina L. Messrs. S. Hadwen, D.V.Sc., Pathologist, Veterinary Research Laboratory, Agassiz, B.C., and E. A. Bruce, V.S., assistant in the same laboratory, are the authors of this sixteen-page bulletin, No. 26, Scientific Series, dealing with a complaint from which 16 horses died out of 24 owned by 11 farmers at St. Elmo, B.C. The subject is as exhaustively dealt with as the space permits, with illustrations of victims and details of curative experiments.

THE SEED BRANCH

Cleaning Seed: Pamphlet No. 1, January, 1918. In the 16 pages which make up this pamphlet, full descriptions, with diagrams and illustrations, are given of the principles that should be adopted and the methods that should be followed in cleaning grass and clover and grain seed.

THE PUBLICATIONS BRANCH

Vacant Lot Gardening in 1917. The article that appeared in THE AGRICULTURAL GAZETTE of December, 1917, has been reprinted in 16-page pamphlet form, being Publications Branch Pamphlet, No. 6.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA

Wheat Growing in Nova Scotia is the subject and title of 1918 Food Production Bulletin, No. 1, published by order of the Development of Agricultural Resources Committee of the Legislature of Nova Scotia. Messrs. M. Cumming, Provincial Secretary for Agriculture, and S. J. Moore, Dominion Seed Inspector, are the responsible authors. The bulletin consists of 12 pages and is a concise review of the situation combined with advice as to seed, soil cultivation, and treatment for the prevention of smut.

ONTARIO

The More Important Fruit Tree Diseases of Ontario, by J. E. Howitt, M.S. Agr., Professor of Botany and Lawson Caesar, B.A., B.S.A., Practical Entomologist and Associate Professor of Entomology. The object of this bulletin, which is number 257 of the Ontario Agricultural College series, is to furnish fruit-growers with information that will enable them to identify the more common diseases to which their trees are subject, and to apply the treatments that experiments and observations extending over eight years have shown to be the most effective. The bulletin consists of 48 pages, treats of upwards of 40 diseases, and is explanatorily illustrated.

MISCELLANEOUS

Canadian Seed Growers' Association, Thirteenth Annual Report, being for the year ending March 31st, 1917. The report, which makes a publication of 40 pages, is divided in two parts, the first consisting of the minutes of the annual meeting, held at Ottawa on July 31st last and recorded in the September number of THE AGRICULTURAL GAZETTE, page 815, and the second of contributions by Dr. C. A. Zavitz, of the Ontario Agricultural College; W. F. Elliott, Galt, Ont.; W. C. Barrie, also of Galt; W. J. Squirrell, O.A.C.; E. D. Eddy of the Seed Branch, Ottawa; the Minister of Agriculture and Secretary for Quebec; W. E. Palmer, Scotch Lake, N.B.; and W. H. McGrégor, Miscouche, P.E.I. A list of members and the minutes of the Manitoba branch of the Association are also given.

Commission of Conservation, Canada. The report of the eighth annual meeting held at Ottawa, January 16-17, 1917, recently issued, makes a handsomely illustrated bound volume of 344 pages. It contains 14 pages of introduction, a review of the work of the Commission by the Chairman, Sir Clifford Sifton, C.M.G., and, besides a dozen other papers, the following relating to agriculture and kindred topics: "The Use of Commercial Fertilizer," by H. J. Wheeler, Ph.D., D.Sc.; "Fertilizers and their Use in Canada," by Frank T. Shutt, M.A., D.Sc.; "Memorandum on Soil Tests," by Dr. F. B. Linfield; "Co-operative Forest Protection," by Henry Sorgius; "The Conservation of a Neglected Source of Food Supply," by J. B. Fielding; "Fur Resources of Northern Canada," by C. Gordon Hewitt, D.Sc., and "Production and Preservation of Food Supplies," by P. H. Bryce, M.A., M.D. In addition 22 pages are devoted to appendices and 19 pages to a copious index.

NOTES

More than 700 county agents and emergency demonstration agents are now at work in thirty-three northern and western states of the American union and the number is increasing rapidly.

Mr. C. B. Curran, Agricultural Representative for Lennox and Addington counties, estimates that as a result of the campaign going on to increase hog production, there will be about fifty per cent of an increase in the counties he represents.

The article "How the Sheep Campaign in New Brunswick was handled," published in the January number of THE AGRICULTURAL GAZETTE, was inadvertently credited to Mr. W. R. Reek, Secretary for Agriculture. The author of the article was Mr. Thomas Hetherington, B.S.A., Live Stock Instructor.

The term District Representative, as applied to officials of Provincial Departments of Agriculture stationed at points throughout the provinces, has not been entirely satisfactory. By mutual arrangement most of the provinces have agreed to the designation "Agricultural Representative." Steps are being taken to bring about the change of title in every province.

After the statement of the number of students in attendance at the Manitoba Agricultural College, given in the December number of THE AGRICULTURAL GAZETTE had been made up, 51 names were added to the enrolment for agriculture and 15 for home economics, bringing the total in the first case to 164 and, in the second, to 99.

Mr. J. W. Stark, Agricultural Representative in Peel county, Ontario, tells of a survey that he made for a farmer. He has a springy piece of land not far from the house and wished to get water for his stock without pumping. Mr Stark took some levels and found that he had a good fall to put in two branches of tile up through a field, and these will meet and go into a cement tank, and the water will be conducted from this to a watering trough. Mr. Stark says he sees no reason why this scheme should not work satisfactorily, winter and summer. He thinks there should be many places in Ontario where the same system of securing an easy water supply would work satisfactorily.

Mr. L. A. DeWolfe, Director of Rural Science Schools, Nova Scotia, suggests, in the *Rural Science Monthly*, the establishing of seed exchanges amongst the pupils of the public schools. Mr. DeWolfe points out that children having saved seeds from their garden will have quantities to spare to exchange with others who have saved different sorts.

On the nomination of H. W. Foght, rural education expert of the Bureau of Education, Washington, D.C., Mr. A. Kennedy, Inspector of Schools at Weyburn, Saskaskatchewan, has been appointed Director for Saskatchewan on the Executive of the National Education Association. As a result of this appointment it is expected that this organization will be made constitutionally and truly international. Mr. Kennedy will attend the convention of this Association to be held in Atlantic City from February 25th to March 2nd.

Col. R. Innes, B.S.A., has been appointed, by the Lands, Forests and Mines Department of the Ontario Government, to supervise the work of the Soldiers' Land Settlement scheme in New Ontario. Colonel Innes is an ex-student of the Ontario Agricultural College and a graduate of Macdonald College. He enlisted almost at the beginning of the war and was invalided home after a year's service in France.

The Ontario Agricultural College, from October 8th to December 10th, 1917, provided a series of lectures in road construction, assisted by a series of models of roads of various descriptions prepared by the Ontario Department of Public Highways. Officials of that Department delivered one lecture a week to the students in the second year. These lectures were as follows: "History of Road Development, Growth of Traffic and Economic Value of Roads," by C. R. Wheelock; "Outline of Road Construction," by Geo. Hogarth; "Road Drainage and Grading," by A. A. Smith; "Road Foundations and Subordinate Structures," by Geo. Hogarth; "Road Surfaces and Materials," by R. C. Muir; "Road Maintenance and Dust Prevention," by G. C. Parker; "Road Machinery and its Operation," by W. Huber; "Road Laws and Organization," by S. L. Squire; "Financial Aspects," by W. Huber, and a "General Summary," by W. A. McLean.

Mr. John Steer of Holland township called at the office of Mr. H. C. Duff, Agricultural Representative, Grey county, Markdale, to report on the results of some sweet clover seed the Department gave him two years ago for experimental purposes. As a result of the small amount of seed which he received Mr. Steer had last year 80 bushels of unhulled seed which he obtained from 10 acres. He expects to have 40 bushels of the hulled seed. He sowed the clover at the rate of 17 pounds per acre on land that would not grow a good crop for seed, which yielded at the rate of 2 bushels per acre. This year he intends trying to sow the clover at the rate of 30 pounds per acre with the expectation of getting hay of finer quality. His cattle are fond of the hay and will now eat it more readily than alfalfa. Mr. Steer has found no difficulty in killing sweet clover by cutting it close to the ground.

At a meeting of members of the Board of Trade, the Rotary Club and prominent farmers of the district, held recently at Hamilton, Ont., Mr. Roy Tobey, of Montgomery, Alabama, outlined what had been done by the Rotary Club of his city to encourage boys between eight and fifteen years to breed pigs. Arrangements were made whereby every member of the club pledged himself to lend five dollars at 6 per cent interest to any likely boy to purchase a sow. Applications were to be made to a local bank by the boy in person accompanied by his father and mother, the members of the Rotary Club becoming responsible. In a short time, 95 pigs were purchased for 95 boys. This was in 1915. In the following year, the arrangements were improved, so that the boys should have only well-bred pigs. When the season of 1916 closed, money had been loaned to purchase 375 pigs.

INDEX TO PERIODICAL LITERATURE

Agricultural Journal, Victoria, B.C., December, 1917.
- Cost of Producing Farm Products, A. B. Tweedle, Provincial Statistician, page 197.
- Winter Butter-Making, T. A. F. Wiancko, Provincial Dairy Instructor, page 202.
- Silo Problems, W. T. McDonald, Live Stock Commissioner, page 192
- Cherry-Growing in British Columbia, M. S. Middleton, Horticulturist, page 193.

British Columbia Fruit and Farm, Vancouver, B.C., January, 1918.
- Gardening for the Home, H. M. Eddie, F.R.H.S., Growing Department British Columbia Nurseries, page 24.

The Canadian Countryman, Toronto, Ont., January 5, 1918.
- Seed Situation in Ontario, C. A. Zavitz, Ontario Agricultural College, Guelph, page 16.
- A National Policy for Grain and Live Stock, Herbert C. Hoover, United States Food Controller, page 4.
- Jan. 19—The Ice Crop—A Winter Harvest for Dairymen, H. H. Dean, page 68.
- Making a Small Flock Pay, Geo. Robertson, page 68.

The Farmer's Advocate and Home Journal, Winnipeg, Man., December 26, 1917.
- Care of Cream Cans, L. A. Gibson, Dairy Commissioner for Manitoba, page 1856.
- What about the Hog, W. J. Elliott Superintendent of School of Agriculture, Olds, Alta., page 1854.
- Jan. 9—The Food Situation, W. J. Rutherford, Dean of College of Agriculture, University of Saskatchewan, page 53.
- Jan. 9—How Would your Seed Grain Test, the Cerealist, Manitoba Agricultural College, Winnipeg, page 46.

Farmer's Advocate, London, Ont., January 10, 1918.
- Feeding the Layers, M. A. Jull, Manager of Poultry Department, Macdonald College, page 48.

The Nor-West Farmer, Winnipeg, Man., December 20, 1917.
- Cost of Producing Pork, W. C. McKillican, Superintendent, Brandon Experimental Farm, page 1448.
- Jan. 5—The New Year Call to Canadian Agriculture, Dean Rutherford, Saskatchewan Agricultural College, J. B. Reynolds, M.A., President, Manitoba Agricultural College, Hon. W. R. Motherwell, Minister of Agriculture, Saskatchewan, Hon. V. Winkler, Minister of Agriculture for Manitoba, and W. F. Stevens, Live Stock Commissioner for Alberta, pages 8 and 9.

Ottawa Farm Journal, January 18, 1918.
- Work of the Cheese Commission, J. A. Ruddick, Dairy and Cold Storage Commissioner, page 8.
- Cow Testing as a Factor in the Improvements of the Dairy Industry, C. F. Whitley, Chief of Dairy Records, page 10.
- The Improvement of the Dairy Herd, Geo. H. Barr, Chief of the Dairy Division, Ottawa, page 12.
- Jan. 18—The Use of Pepsin in Making Cheese, G. H. Barr, Chief of the Dairy Division, page 12.

The Canadian Horticulturist & Bee-keeper, Toronto, January, 1918.
- Air Conditions in the Bee Cellar, F. W. L. Sladen, Apiarist, Dominion Experimental Farms, page 7.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

699—**Agricultural and Economical Development of Venezuela.**—Duhaut, in the *Bulletin de l'Office de Renseignements agricoles du Ministere de l'Agriculture de France,* Year 15, October-November, 1916, pp. 441-453. Paris, 1916. (5 pp. in Institute Bulletin).

Venezuela has an area of 424,710 square miles and a population of 2,800,000, not including the Indians. The official language is Spanish. From an agricultural point of view the country is divided into three regions: (1) the *maritime region* which is the true agricultural region; 2) the *breeding region,* in the plain of Orinoco basin; (3) the *forest district* on the South.

Before the war the imports into Venezuela came chiefly from England, Germany, France and Holland, and consisted in a large part of agricultural products. The imports from England and Germany were chiefly agricultural implements.

Most of the agricultural industries are still only slightly developed in Venezuela. Among the industries which give opportunity for development is cattle breeding. Large companies might be formed for the improvement and working of the immense pasture lands of the northern and western basin of the Orinoco in conjunction with the Venezuelan land owners, who would willingly support such an undertaking. There are no diseases of cattle in the country. Reports of an epidemic of disease are false, and were probably spread by foreign agents.

Among other resources are fibre plants, a large variety of which are found in the Cumana and Barquisito, the Andes and the Orinoco Delta. Immediate use of the fibre plants would give profitable results. The e are many oil yielding plants in the country, and petroleum wells in the coast districts, with great resources of asphalt and bitumen near them. Many plants yielding tannin and dyes could be put to use immediately and the raw products sent to Europe. Among the fertilizers found in Venezuela are guano, phosphates, saltpetre, magnesite and copper sulphate in a pure state.

The principal products which require the use of special machinery for their extraction and special transport are iron ore, copper ore, lead ore and silver ore for export, coal gypsum and alumina for home use. There are great opportunities for the cultivation of gums, chiefly the rubber of *Hevea brasiliensis.*

700—**Agriculture in Queensland in 1915-1916.**—*Annual Report of the Department of Agriculture and Stock for the Year 1915-1916,* pp. 1-158. Brisbane, 1916. (2 pp. in Institute Bulletin).

701—**The Relation of Farm Weeds to Hay Fever.**—Hall, H. M., in the *Monthly Bulletin of State Commission of Horticulture,* Vol. VI, No. 2, pp. 44-47. Sacramento, California. February, 1917.

CROPS AND CULTIVATION

704—**Factors Affecting the Evaporation of Moisture from the Soil**—HARRIS, F. S. and ROBINSON, J. S. (Utah Agricultural Experiment Station), in the *Journal of Agricultural Research*, Vol. VII, No. 10. pp. 441-461. Washington, D.C., 1916.

Soil moisture, which is of great importance in agriculture, may, in arid districts, be lost either by capillary attraction, which draws the water to the surface, or by evaporation, which is one of the most important factors in preserving the moisture of the soil. This paper gives, first a critical review of the scientific literature on this subject, then a description of a series of experiments undertaken from 1912 to 1916 in different soils and under varying conditions.

The results show that the evaporation of the water of the soil is in direct connection with the original moisture; the differences are slighter when there is much moisture than when there is little, and there appear to be critical points at which evaporation undergoes sharp variations. Evaporation in moist soil diminishes very rapidly in proportion as the moisture in the air increases. Air currents cause an increase in evaporation, which, however, becomes very slight beyond a certain velocity. In completely saturated soils evaporation is greater when the soil particles are fine than when they are coarse. Decrease in sunshine causes a great decrease in evaporation, which is also affected by sudden variations in temperature, however slight they may be. Evaporation is effectually restricted by a thin, dry mulch but more so when the particles are coarse than when they are fine. Compacting the surface increases evaporation. Finally, evaporation may be reduced by the addition of a concentrated solution of soluble salts.

A bibliography of 41 publications is appended.

705—**The Effect of Soil Moisture Content on Certain Factors in Wheat Production.**—HARRIS, F. S. and MAUGHAN, H. T., in *Utah Agricultural College Experiment, Station Bulletin*, No. 152, pp. 1-15. Logan, Utah, February, 1917.

A knowledge of the intimate relations between the crop and the moisture of the soil is important to every farmer, particularly to those in arid districts. For this reason the authors carried out experiments to determine the water requirements of wheat and the water content of the soil during various stages in the growth of the crop.

The experiments were carried out during the years 1913, 1914 and 1915 in 36 galvanised iron tanks, each of which contained 476 pounds of water-free loam with a high lime content. Spring wheat was sown and evaporation prevented first by a ½-inch sand mulch, and later with paraffined paper; any loss was made up with very pure tap water. The tanks were divided into 18 series of 2 tanks each, the series having varying moisture conditions. The life of the plant was divided into 3 periods: 1) from planting until there were 5 leaves; 2) from the 5-leaf stage to full earing; 3) from full earing to maturity.

The results showed that the highest yield of grain was obtained when the soil contained about 20 % moisture throughout the season. This was about ⅓ of the moisture required to saturate the soil completely. Wheat seems particularly sensitive to soil moisture during the period immediately preceding earing.

There was a greater loss of moisture by evaporation and transpiration from soil producing a large crop than from a free water surface, but the loss was greater from the water surface than from a soil producing only a small crop.

Under favourable moisture conditions the crop was 20 times as great as under unfavourable ones. Wheat may suffer as much from excessive moisture as from excessive dryness; the importance of favourable soil moisture conditions is, therefore, clear.

706—**Rainfall, Irrigation and Subsoil Water in the United Provinces of Agra and Oudh.**—MOLONY, E. A., in *The Agricultural Journal of India*, Vol. XII, Part I. p. 84-89. Calcutta, January, 1917. (1 page in Institute Bulletin).

707—**The Drainage of Irrigated Shale Land.**—MILLER, D. G., and JESSUP, L. T., in *United States Department of Agriculture, Bulletin* No. 502, pp. 40, Washington, D.C., April 23, 1917. (2 pp. in Institute Bulletin).

708—**Spray Irrigation.**—WILLIAMS, MILO B., in the *United States Department of Agriculture Bulletin* No. 495, pp. 40, figs. 19. Washington, D.C., February 14, 1917. (4 pp. in Institute Bulletin).

During the last ten years spray-irrigation (1) has spread greatly through the United States, particularly in the Atlantic Coast from Massachusetts to Florida. It is particularly well adapted to supplement uncertain rainfall in market gardens and orchards. The economic conditions must, however, be favourable, as the cost of installing this system is relatively high. While a portable outfit may cost only $50 per acre, a stationery distribution system may cost as much as $150 per acre, not including the cost of a pumping plant and the laying down of a main pipe line to the fields.

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(1) See also *Bulletin of Foreign Agricultural Intelligence*, March, 1915, No. 1090, and April, 1916, No. 1330.

The cost of installing a stationary plant for a small acreage amounts to $250 per acre, and the annual incidental expenses come to $51 per acre. The high cost prohibits the use of this method for many crops, but if it is combined with ordinary irrigation methods the expenses are less heavy. Spray irrigation is practically independent of the topography of the field, and can be applied to land too rolling or rough for surface methods.

As spray irrigation is comparatively recent, the author carried out various tests to determine the amount of water required by this system.

In damp climates amounts not exceeding ¼ inch are considered sufficient for seed beds and young vegetables, whereas maturing garden crops and strawberries require ½ to 1 inch. In the growing season market gardens need from 4 to 6 inches. The Florida citrus groves may require as much as 3 inches per irrigation.

In arid districts market gardeners irrigate every 3 or 4 days, while citrus growers apply from 4 to 6 inches each time. As a rule in damp districts a depth of 1 inch per week suffices, but in arid districts 1½ inches per week is required. Information is given on the installation of pumps, and the sinking of shallow wells and deep wells.

Three types of spray irrigation have been generally adopted:

1) Hose and movable nozzle or movable lines fed from an underground pipe system and hydrant;

2) Circular nozzles fed from an under ground pipe system;

3) Overhead spray lines fed from an underground main feed pipe.

Details of each type are given with appropriate illustrations in the article in the Institute Bulletin.

709—**Rotations and Tillage Methods in Western Nebraska.**—SNYDER, W. P., and OSBORN, W. M., in *The University of Nebraska Agricultural Experiment Station Bulletin* No. 155, pp. 1-48. Lincoln, Neb. June 1, 1916. (1 page in Institute Bulletin).

710—**The Plant Food Materials in the Leaves of Forest Trees.**—SEREX, P. Jr., in *The Journal of the American Chemical Society*, Vol. 39, No. 6, pp. 1286-1296. Boston, Pa., June, 1917. (2 pp. in Institute Bulletin).

711—**The Chemical Composition of Basic Slag.**—JANSSENS, VAN RAAIJ, C., *Verslagen van Landbouwkundigen Onderzoekingen der Rijkslandproefstation*, No. XX, pp. 26-33. (1 p. in Institute Bulletin).

712—**Estimation of the Cyanamide Nitrogen in Calcium Cyanamide and Lime Nitrogen.**—BERKAUT, A. D., HENDRICKSZ, R. D., and WIND, G., in *Verslagen van Landbouwkundige Onderzoekingen der Rijkslandbouwproefstation*, No. 20, pp. 43-51. The Hague, 1917. (1 page in Institute Bulletin).

713—**Inoculation Tests on Lucerne and Lupin Seedlings, in Denmark.**—CHRISTENSEN, HARALD R., in *Tidskrift for Planteol*, Vol. 21, pp. 97-131. Copenhagen, 1914; and (as original abstract) in *Centralblatt fur Bakteriologie, Parasitenkunde ind Infektionskrankheiten*, Vol. 46. Jena, 1916. (1 page in Institute Bulletin).

714—**Report on Humogen.**—RUSSELL, E. J., in *The Journal of the Board of Agriculture*, Vol. XXIV. No. 1 pp. 11-20. London, April, 1917.

This paper gives an account of experiments carried out in 1915 at the request of the Board of Agriculture in order to determine the fertilising value of "humogen". This product is prepared by Prof. W. B. Bottomley's method as follows: peat is first neutralized, bacterial decomposition is then brought about to a certain point, and the peat finally inoculated with a culture of nitrogen-fixing organisms.

The author reviews the results obtained by other workers—those of the discoverer, at Kew (1) of Chittenden, at Wisley (2), of Voelcker, at Woburn, and at the Midland Agricultural College. These experiments were largely unfavourable, whereas others, carried out at Sparsholt, were favourable up to a certain point, without, however, offering sufficient guarantees. Further tests made at the Lea Valley Experiment Station were also unfavourable(3)

In the experiments described, carried out partly at Rothamsted and partly at the Harper Adams Agricultural College, two qualities of humogen were used, one prepared by the Manchester Corporation cleansing Department, from peat from Chat Moss, the other prepared by the Entwistle Mountain Peat Estate Company from peat overlying limestone deposits, Usually 10 cwt. per acre were used. The experiments were made with mangolds, pot plants and mustard in pots, and water cultures of barley.

All the experiments gave negative results and do not permit the assumption that humogen possesses any particular agricultural value. This is all the more notable as it was said to be 50 times as efficacious as manure, whereas it does not surpass any other organic manure with the same content of nitrogen. The price asked, $20 per ton, is in no wise justified by the results obtained. As these results contradict the statement made by the authors, two circumstances must be borne in mind: *a*) good results were without doubt obtained in the pot experiments at Kew and Wisley; *b*) the composition of humogen is obviously very variable.

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(1) See *Bulletin of Foreign Agricultural Intelligence*, July 1914, No. 410.

(2) See *Bulletin of Foreign Agricultural Intelligence*, October 1916, No. 497.

(3) See *Bulletin of Foreign Agricultural Intelligence*, February 1915, No. 982.

Humogen, in the proportions used at Kew and Wisley (1 part to 7 or 8 parts of soil), may be a valuable addition to the compost used for potting up plants, but it does not appear to be superior to an equal amount of untreated peat in an equally fine state of division. This finely-divided organic matter is useful for several purposes in pots and when it forms 12% or more of the whole bulk it may have a favourable effect. It is quite possible that heavy dressings would have good effects on poor soils, but they would have to be on a far larger scale than is possible at present prices.

The composition of humogen is far from uniform. Prof. Bottomley's analyses show it to contain 4.310 % of total nitrogen. Analyses made at Rothamsted of humogen from Manchester showed a nitrogen content of 0.570 % in the fertilizer as sent out, and 1.29 % in the dry matter; analyses of Entwistle humogen showed the corresponding values to be respectively 0.431 % and 1.32 %. In some samples Dr. Voelcker found 0.48 % of soluble nitrogen, in others only 0.08 %.

This variability is very unfortunate. It is possible that some samples have acted well in the field; it is certain that others have not. There is no definite evidence that "bacterisation" really adds to the value of the peat. The wisest plan would seem to be to concentrate on experimental work and to stop all propagandist operations until some definite basis of incontrovertible fact has been attained. It will take a long time to obtain this result as the problem of utilizing peat is sufficiently difficult to occupy the whole attention of a laboratory for some years.

A proof of this paper was sent to Prof. Bottomley, who, in a note, states that the product sent to the author as humogen was wrongly prepared and was in no way composed of bacterised peat.

715—**The Use of Bakers' Ash as Artificial Soil Almost free from all Mineral or Organic Matter, Suitable for the Study of Plant Growth and the Influence of various Chemical Fertilizers.**—GAUTIER, A., in *Comptes rendus des séances de l'Académie des Sciences*, Vol. 164, No. 26, pp. 985-986. Paris, June 25, 1917.

717—**The Influence of Water and Mineral Matter on the Germination of Peas.**—MAQUENNE, L., and DEMOUSSY, E., in *Comptes rendus des séances de l'Académie des Sciences*, Vol. 164, No. 26, pp. 979-985. Paris, June 25, 1917. (2 pp. in Institute Bulletin).

718—**"Giovanni Raineri" and "Emilio Maraini", New Varieties of Autumn Barley Selected in Italy.**—STRAMPELLI, NAZARENO, in *L'Italia Agricola*, Year 54, No. 5, pp. 208-209, No. 6, pp. 240. Piacenza, May 15 and June 15, 1917.

721—**Thirty-seven Years of Spruce Selection, in Austria.**—REUSS, in *Centralblatt fur das gesamte Forstwesen*, Year 42, Pts. 11-12, pp. 383-417. Vienna, November-December, 1916. (3 pp. in Institute Bulletin).

723—**Fall-Sown Grains in Maryland and Virginia.**—STANTON, I. R., in *United States Department of Agriculture, Farmer's Bulletin* 786, 23 pp., 6 figs. Washington, D.C., February, 1917.

725—**Experiments in Oat-Growing in the North of Sweden.**—RHODIN, SIGURD, in *Kungl. Landtbruks Akademiens Handlingar och Tidskrift*, No. 2, pp. 150-160. Stockholm, 1917. (1 page in Institute Bulletin).

732—**The Contribution of Forestry to the Problem of Public Nutrition during the War, in Germany.**—BORGMANN, in *Tharandter Forstliches Jahrbuch* Vol. 67, Pt. 6-7, pp. 367-456. Berlin, 1916. (3 pp. in Institute Bulletin).

LIVE STOCK AND BREEDING

733—**Notes on Some Animal Parasites in British Guiana.**—BODKIN, G. E., and CLEARE, L. D., in the *Bulletin of Entomological Research*, Vol. VII, Pt. II, pp. 179-190. London, October, 1916. (2 pp. in Institute Bulletin).

734—**Mercury Compounds in the Treatment of Epizootic Lymphangitis.**—FINZI GUIDO, in *Bulletin de la Société de Pathologie exotique*, Vol. X, No. 6, pp. 428-430. Paris, June, 1917. (1 page in Institute Bulletin).

735—**Ulcerative Stomatitis in Horses.**—RENE, CH., in *Le Progrès agricole*, 31st year, No. 1537, p. 311. Amiens, July 1, 1917.

736—**Rabies and Haemorragic Septicaemia in some Young Buffaloes, in Italy.**—Mori, Nello, in *La Clinica Veterinaria,* Year XI, No. 7, pp. 177-191; No. 8, pp. 211-223. Milan April 15 and 30, 1917. (1 page in Institute Bulletin).

738—**Studies in Milk Secretion.**—Hammond, J., and Hawk, J. C., (*School of Agriculture, Cambridge*) in *The Journal of Agricultural Science,* Vol. VIII, part 2. I. The Effect of Nutrition on Yield and Composition, pp. 139-146. II. The Relation of the Glands of Internal Secretion to Milk Production, pp. 147-153. (2 pp. in Institute Bulletin).

Cattle Breeding in the Argentine Republic at the Present Day.—Martinoli, G., Professor of Zootechny, National University of Buenos Aires, in *International Review of the Science and Practice of Agriculture,* Year VIII, No. 8, pp. 1073-1084. Rome, August, 1917.

The Argentine cattle are descended from the Andalusian breed imported by the Spaniards at the beginning of their conquest. They excel neither in the production of meat nor in that of milk, but did good service so long as local and export demands were limited. During the second half of the the 19th century breeding cattle of various British races began to be imported. By far the greater number were Shorthorns. The cattle entered in the Argentine Herd Book to date are classified as follows: Shorthorn 93,833; Hereford 19,407; Aberdeen Angus 8,334; Red Shorthorns 334; Red Polled 211; Devon 35; Jersey 78 and Flemish 599.

The last estimate made in 1913 placed the number of cattle in Argentina at 30,796,000. With the exception of the bulls the cattle are kept on open pasture lands, and live almost exclusively on natural pasture or alfalfa; it is very rarely they are fattened by being fed maize, ensilage or bran, etc.

A serious problem, the rational solution of which will have a large influence on the future of cattle breeding in practically the whole of northern Argentina, is the improvement of the native "criolla" cattle. Such improvement is greatly hindered by "tristeza" (bovine piroplasmosis), and the climate. The "criollas" are relatively immune but the improved breeding stock introduced are very susceptible to the fever. Strenuous efforts are being made to eliminate the disease. The climate also has a very bad effect on the imported breeding stock, and attempts are being made to gradually acclimatize a certain number.

In 1914 Argentina exported 115,556 live cattle, 1,100,080 metric tons of frozen meat, 2,500 metric tons of "tasajo", and 153,000 metric tons of meat extracts and preserves. The live cattle are chiefly sent to the markets of the other South American Republics, and the frozen meat to the United Kingdom. In 1914, 3,211,485 cattle were slaughtered in the abattoirs, cold storage slaughter houses and the salt meat factories.

In 1908, 2,163,900 dairy cows were in milk in the Argentine; about 800,000 of these were Shorthorns. The average yield is very low, barely exceeding 220 gallons per annum. This low production is due to life in the open pasture lands, lack of fodder reserves, and lack of selection.

In 1915 Argentina produced 19,436,000 pounds of butter, and exported 10,185,000 pounds. In 1913 the production of cheese was 12,530,000 pounds and the imports 11,110,000 pounds. The following varieties of cheese are manufactured: Cheddar, Cheshire, Dutch, Fontina, Grana, etc. All are of excellent quality.

740—**Feeding Trials with Cattle at the Model Farm of Dikopshof, Germany.**—Richardson, A., in *Landwirtschaftliche Jahrbucher,* Vol. 49, Parts 3-4. Berlin, 1916. (4 pp. in Institute Bulletin).

741—**I. Feeding Cottonseed Meal and Hulls to Dairy Cows.—II. Feeding Value of Cottonseed Meal vs. Cold Pressed Cottonseed Cake.—III. Feeding Value of Purchased Feeds vs. Pasture vs. Soiling Crops.**—Moore, J. S., in *Mississippi Agricultural Experiment Station Bulletin* No. 174, pp. 1-16. Agricultural College, Mississippi, 1917. (3 pp. in Institute Bulletin).

742—**Skim Milk and Milk Substitutes for Calf Feeding.**—Hunziker, O. F., and Caldwell, R. E., in *Purdue University Agricultural Experiment Station Bulletin* No. 193, Vol. XIX, pp. 1-104. Lafayette, Indiana, September 1916. (3 pp. in Institute Bulletin).

743—**The Production of Baby Beef.**—Ray, S. H., in *U. S. Department of griculture, Farmer's Bulletin* No. 811, pp. 1-24. Washington, D.C., April 1917.

During recent years the United States live-stock markets have undergone a great change which has reacted strongly on the breeding industry. This change is expressed by the ever-increasing demand for high-grade, well-fattened calves weighing from 900 to 1200 lbs. This demand could only be satisfied by animals of from 14 to 20 months belonging to the early-maturing beef breeds, Hereford, Aberdeen-Angus or Shorthorn. As this class of animal differs markedly from other beef classes it is called "baby beef."

The production of this type of cattle demands more skill than that of older slaughter animals, since the latter is chiefly fed on the cheaper roughages of the farm. Farmers are also attracted to this industry by the increasing scarcity of feeder cattle, a scarcity often connected with the progressive increase in land-values, the cost of labour, taxes, etc., which, in many districts, make it difficult to realize profits on older cattle. Thus butcher's cattle of from 3 to 5 years bred on ranches were replaced, first by adult animals fattened on mixed farms, then by baby beef raised on intensive breeding farms. Baby beef is obtained by using the maximum producing capacity of the earliest maturing breeds, and by intensive feeding.

This change is due to many causes. Foremost of all is the fact that young cattle make better gains than older cattle on the same quantity of foodstuff. Yearlings can make 25 to 40 % more gain than mature cattle on the same amount of food. As the period of production is shortened, it is possible, with the same amount of feed and pasture, to increase the number of breeding cows and the number of calves produced every 18 months. Heifers, fattened on the same system, may be sold when 18 months old as they will then weigh from 900 to 950 lbs. and will have cost the same amount as the steers. When over 2 years they are already subject to the depreciation of all butcher's animals. Moreover, baby beef, when fattened for market under 2 years of age, allows the farmer to choose the moment when good prices may be realized, for, between the age of 14 months and 2 years the animal is always in good condition for the market. The period of fattening may thus be lengthened when prices are low and shortened when they are high. This greatly helps to keep the market steady. The consumer prefers the size and quality of the cuts from a well-bred, highly finished yearling, and markets, which are more stable for this class than any other class of cattle, are paying premium for this product. Prime baby beef usually commands a price equal to that of the highest grade of mature fat cattle.

All breeding farms are not suited to the production of baby beef, in fact there are certain conditions under which it is inadvisable. A good breed of early maturing cattle, good pasture and a plentiful supply of concentrated foodstuffs are essential to success.

As a rule pure-bred cows are not necessary, but they should have two or three crosses with a pure beef-strain to avoid a preponderance of dairy blood which prebents the successful rearing of baby beef. The most satisfactory results are obtained with pure-bred selected Aberdeen-Angus, Shorthorns and Herefords, and the herd bulls, in all cases, should be chosen from these breeds. The most recent experiments show that it is most advantageous to breed and fatten the calves on the same farm.

When breeding baby beef it is important to give them concentrated foodstuffs with a grain basis. Except in cases in which the cows produce a certain amount of milk during the weaning period it is best to give these foods to the calves as early as possible, that is to say, when they are from 4 to 6 weeks old. Where pasture is available, autumn-born calves are turned out to graze in spring; this enables the amount of roughage fed to be reduced to a minimum, while as much concentrated foodstuffs as possible is still given. In some cases very good pasture prevents the animal from consuming the desired amount of grain, and causes a set-back in the increase of weight. During the last fattening period pasture should not be used. Where winter pastures are available they will greatly decrease the cost of both growing and fattening the calves.

The baby beef industry also helps to develop the hog breeding industry, as the residues of the concentrated foodstuffs used may thus be best utilized. Shoats from 70 to 100 lbs. are used, and consume the undigested cereals given to the cattle. As maize is the chief concentrated foodstuff used during fattening, the breeding of hogs on the residues of the fattening adds greatly to the profits. From 1 to 2 lbs. of pork may be obtained for each bushel of maize fed to the calves.

Tables are given of the progressive quantities of concentrated foodstuffs which should be given to the calves month by month, both for those to be finished in 15 months and for those to be finished in 18 months, autumn and spring born calves being considered separately.

744—**The Shorthorn in Ireland.**—*Live Stock Journal*, Vol. LXXXVI, No. 2257, p. 3. London, July 6, 1917.

745—**Experiments in the Disposal of Irrigated Crops through the Use of Hogs.** HOLDEN, JAMES A., in *U. S. Dept. of Agriculture, Bulletin* No. 48, 25 p. Washington, D.C., Feb. 26, 1917.

The farmer who makes a success on high-priced irrigated land must not only grow large crops, but he must market these crops in the most advantageous way. Most crops grown in localities far removed from the large consuming centres should be marketed in condensed form, so as to reduce the cost of transportation. For example, a hundred pounds of butter can be shipped to market much more cheaply than the hay and grain required to produce this butter. The farmer should take advantage of this fact in organizing his operations. In addition to this saving, the manure resulting from the feeding of the crops makes it possible to produce larger crops in subsequent years.

Because of the relatively small capital and short time required to get a start in the swine industry and because of the high efficiency of hogs in utilizing certain field crops, swine production is a specially promising industry for irrigation farmers. In order to secure information regarding methods of utilizing hogs in the disposal of certain field crops produced on irrigated lands, experiments were conducted at the Scottsbluff Experiment Farm on the North Platte Reclamation Project in 1912, 1913, 1914 and 1915.

In three years' experiments, with eight lots of hogs, and during which alfalfa pasture was supplemented with a 2 per cent ration of corn, an average gain of 3.181 pounds per season was made from an acre of alfalfa pasture and 7.844 pounds of corn. It required an average of 2.47 pounds of corn in addition to alfalfa pasture to produce 1 pound of pork. If the gains are valued at 7 cents a pound and corn at 60 cents a bushel, or $1.07 a hundred-weight, the average annual return was $138.75 per acre of alfalfa pasture. If the corn fed is valued at 60 cents a bushel and the alfalfa pasture at $15 an acre the average cost of 100 pounds of gain was $3.11. If the average yield of the alfalfa plats in the same field is assumed to represent the yield of the pastured plats the hogs paid an equivalent of $25.13 per ton of hay.

In two years experiments with alfalfa pasture, with and without supplemental feed, an average annual return of $45.08 per acre was secured where no supplement was used as compared with $70.20 where a 1 per cent ration of corn was used—$128.49 from a 2 per cent ration of corn—$121.96 from a 2 per cent ration of barley, and $168.25 from a 3 per cent ration of corn. The rate of gain and the carrying capacity of the pasture increased with the quantity of grain fed. Ground barley appeared to be as good, pound for pound, as shelled corn as a feed for hogs on alfalfa pasture.

Sows and pigs on alfalfa pasture, with a 2 per cent ration of grain, made an average gain of 1,574 pounds per acre of alfalfa pasture from May 1 to July 1, or a net return of $66.84 per acre. When corn was used the return varied from $54.11 to $69.97 per acre, and when barley was used the return was $77.76 per acre.

In three years' experiments, hogging corn without supplementary feed produced an average of 896 pounds of gain, worth $65.72 per acre, or $1.50 per hundredweight of the estimated yield of corn.

In two years' experiments, hogging corn without supplementary feed produced an average of 744 pounds of gain, worth $52.08 per acre, as compared with 930 pounds of gain, worth $65.10, where the hogs had access to alfalfa pasture, and 1.029 pounds of gain, worth $72.03, where the hogs were fed tankage in addition to the corn. Where no supplementary feed was used the hogs paid $1.34 per hundredweight for the estimated yield of corn, as compared with $1.55 per hundredweight where the hogs had access to alfalfa pasture and $1.50 per hundredweight where tankage was used. The use of either alfalfa or tankage resulted in more rapid and cheaper gains than were secured where no supplementary feed was used.

746—**Profitable Pork Production in the United States.**—WALTER, H. B., in *Missouri State Board of Agriculture,* Monthly Bulletin, Vol. XIV, No. 8, pp. 21-25. Columbus, Mo., 1916.

The pork production branch of the live stock industry of the United States supplies over sixty per cent. of the meat diet of the country.

One reason the hog is such a great factor in meat supply is because of his prolificacy. The increase from cattle is estimated to be from 80 to 90 per cent in one year; of sheep it is from 100 to 150 per cent; while in hogs it is from 1000 to 1800 per cent yearly. The hogs can populate the farms with meat producing animals in a short time and *overcome any meat shortage that may exist.*

The hog is a very efficient animal because he can produce a pound of meat from less than any other animal. It requires about thirteen pounds of dry matter to produce one pound of gain in cattle, about eight to nine pounds in sheep and only four to five pounds in hogs.

The hog dresses a higher per cent of edible meat. Cattle dress from 60 to 65 per cent, sheep 55 to 60 per cent, while hogs dress from 75 to 80 per cent.

There is more energy in a pound of pork than in either a pound of beef or mutton. Comparing fresh ham with fresh hindquarter of beef and mutton, a pound of the ham has 60 % greater energy value than a pound of mutton and 45 % greater energy value than a pound of beef

The essentials in producing hogs at a profit in the United States are the following: the person engaging in the business must have a liking and capability for the business; have a good location; select well bred animals, have a reasonable amount of equipment; feed a balanced ration, *including pasture;* keep the herd free from disease; find or make a good market for the product and last, but not least, keep an account with the herd, so that it may be known whether the hogs are making a profit or loss, and how much.

747—**Breeding for Egg Production—A Study of Annual and Total Production.**—BALL, E. D., BYRON ALDER and EGBERT, A. D., in *Utah Agricultural College Experiment Station Bulletin* No. 148, 60 pp., 22 tables. Logan, Utah, December, 1916. (1 page in Institute Bulletin).

749—**New Hive with Store Chamber: the "Sans Souci".**—FOURNIER, M., in *L'Apiculteur*, 61st Year, Nos. 3 and 4, pp. 50-54. Paris, March April 1917. (2 pp. in Institute Bulletin).

751—**On the Biology of the Shad (Alosa finta Cuv.) of the Algerian Coast.**—BOUNHIOL, J. P., in *Comptes rendus des Séances de la Société de Biologie*, Vol. LXXX, No. 10, pp. 480-483. Paris, May 19, 1917.

752—**Fish-breeding in Switzerland during 1916.**—*Bulletin Suisse de Pêche et Pisciculture*, Year XVIII, No. 5, pp. 75-78. Neuchatel, May, 1917. (1 page in Institute Bulletin).

FARM ENGINEERING

753—**Mechanical Cultivation in France.** DANTHIN, CH., in *Le Génie Civil*, Vol. LXX, Year 37, Nos. 15 and 16, pp. 237-240 and 256-260. Paris, April 14 and 21, 1917. (8 pp. in Institute Bulletin).

The writer emphasizes the importance of mechanical cultivation and gives an account of the legislative measures taken in France in order to encourage its development. He then examines the conditions which govern the use of mechanical power and describes the principal types of tractors tested during the last 2 years. He also gives an account of the economic results obtained in recent trials.

754—**The Actual Extent of the Use of Motor Tractors on American Farms.**—*The Economic World*, N.S., Vol. XIII, No. 14, pp. 482-483. New York, April 7, 1917. (1 page in Institute Bulletin).

755.—**The New Ford Tractor.**—I *Le Génie Rural*, Year 9, No. 67, p. 13. Paris, 1917.—II. *The Implement and Machinery Review*, Vol. 43, No. 507, pp. 293-294. London, July 1, 1917. (1 page in Institute Bulletin).

756—**The "Once-Over" Tiller.**—*The Implement and Machinery Review*, Vol. 43, No. 506, p. 176. London, June 1, 1917. (1 page in Institute Bulletin).

757—**Devices for Disabled Farm-hands.**—GUILLAUME, A. C., in *La Nature*, No. 2275, pp. 278-283. Paris, May 5, 1917.

In France, 70 % of the total number of labourers are employed on farm work, and it is therefore logical to suppose that the same proportion will occur among the wounded.

The writer reviews the various methods for making use of disabled men according to the type of and the possibility of their improvement. With regard to those who have been wounded in the lower limbs it would be best to eliminate them from work which required much walking or rapid movement. They could be utilized either for the indoor work of the farm or as drivers of tractors, or again for working stationary machinery such as threshers.

On the other hand, the place for a man with a disabled arm is in the fields; with the help of an artificial aid he is capable of performing various kinds of work in turn; drive a team, reap, even dig and look after crops and trees generally.

The improvement of injuries depends upon medical or surgical treatment and upon education. The latter involves the following:

a) Education of the healthy limb to act as leading aid. This will be the personal care of the wounded man himself.;

b)The modification of the stump, which forms a kind of preparation of the patient before receiving his apparatus. This is the domain of the doctor or surgeon;

c) The choice of the apparatus requires exceedingly careful study.

The devices for the lower limbs differ very little from those in ordinary use. They should be strong, not too heavy, and with interchangeable parts, easy to procure at a minimum expense.

A longer description is given of the devices for arms. These are highly specialized for agricultural use. The artificial aid consists of a cap fitting over the damaged part and of a stem ending in a socket to receive a hook or other substitute for a hand.

Fig. 1 shows an apparatus for an arm amputated about third of the way down. It consists of: 1) a stem replacing part of the humerus; 2) a joint; 3) a stem representing the bone of the forearm and ending in a socket for artificial hand.

Instead of the straps which serve for a hand, the Jullien tool-holder is preferable for the farm labourer. The Bourreau series of hands permits of a much greater number of different actions than the other systems. They fit into the tool-holder and have the advantage of being interchangeable according to the different requirements.

Bourreau has thought out 6 different hands, of which 5 are for working purposes and one for use when at rest.

The working hands are: for navvy (fig. 3), for vine-dresser and forester (fig. 4 and

Devices for disabled farm hands

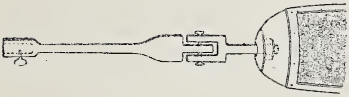

Fig. 1.—Forearm with elbow joint.

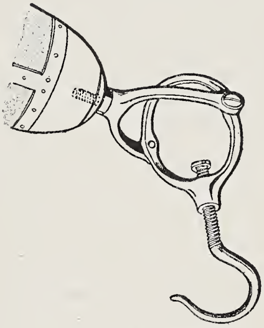

Fig. 3.—Hook for navvy.

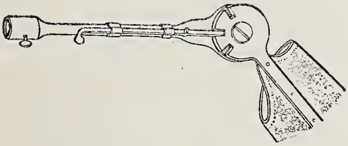

Fig. 2.—Elbow joint with bol for fixing arm at different angle.

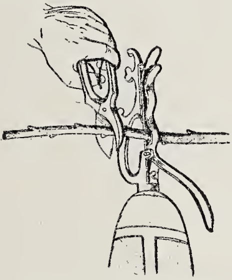

Fig. 5.—Hand for vine-dresser.

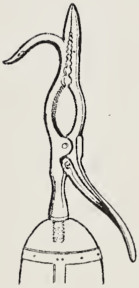

Fig. 4.—Hand for pruning.

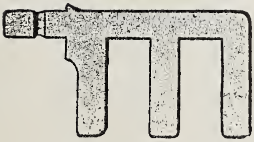

Fig. 6.—For holding reins.

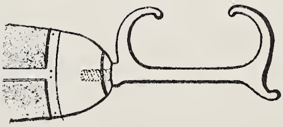

Fig. 7.—Hook for driver of tractor.

5), for driver of vehicles (fig. 6) and two hands for drivers of tractors (fig. 7.)

These devices allow all wrist movements to be copied. The hand for the navvy is formed of a moveable ring furnished with a hook, which can either swing or be fixed. It can serve for a number of actions: digging, ploughing, pushing a wheel-barrow, pulling a hand-cart, working a pump, holding a pail, a basket, etc., loading manure, driving a cart.

For driving a team the hook is replaced by a reingrip which allows the driver to drop the reins easily when necessary. The hands are capable of being used for pruning and certain indoor jobs, such as the preparation of scions for the vine-dresser, cuttings for the gardener, etc.

The object of the double hook for motor drivers is to allow of the movements of pushing and pulling and such other actions as are required for working the levers.

759—**Mechanical Installation for a Stable (Naegeli Patent.)**—*Le Génie Rural*, Year 9, No. 68, pp. 12-13. Paris, 1917. (3 pp. in Institute Bulletin).

The object of this invention is to equip a stable in such a way as to reduce the amount of labour to a minimum. It is particularly intended for carrying food and litter and distributing same among the stores, at the same time removing the manure by means of endless conveyors, elevators, etc.

760—**Reinforced Concrete Buildings.**—ESPIÉALLIER, G., in *Le Génie Civil*, Vol. LXX, No. 20, pp. 322-324. Paris, May 19, 1917. (2 pp. in Institute Bulletin).

761—**The New Decauville Cement Brick.**—LANORVILLE, GEORGES, in *La Nature*, No. 2278, pp. 326-329. Paris, May 26, 1917. (1 page in Institute Bulletin).

M. Decauville has invented a new brick already used with success in constructing water-wings, and which will be very useful in constructing farm buildings cheaply and rapidly.

RURAL ECONOMICS

762—**Labour Requirements of Crop Production.**—COOPER, T. P., PECK, F. W., and BOSS, A., in *The University of Minnesota Agricultural Experiment Station, Bulletin* No. 157 (Division of Agronomy and Farm Management), pp. 1-55. University Farm, St. Paul, Minnesota, March, 1916. (8 pp. in Institute Bulletin)

The cost of producing farm products under actual farm conditions has been studied at the University of Minnesota Experiment Station for more than 10 years (1). The data thus obtained have been used to determine the actual labour requirements of farm crops in terms of man and horse hours per acre and to define some of the principles underlying the use of man labour on the farm, so as to furnish a basis which will allow a better estimation of the cost of production.

A summary of the above Bulletin is given in the Institute Bulletin.

(1) Cf. HAYS, W. M., and PARKER, E. C., The Cost of Farm Products, in *U. S. Dept. of Agriculture, Bureau of Statistics, Bull.* 48, and *Minnesota Experiment Station Bull.* 97, 1906.

PARKER, E. C., and COOPER, THOMAS, The Cost of Producing Minnesota Farm Products, *U. S. Dept of Agriculture, Bureau of Statistics, Bull.* 73, and *Minnesota Experiment Station Bull.* 117, 1910.

COOPER, THOMAS, The Cost of Minnesota Dairy Products, *U. S. Dept. of Agriculture, Bureau of Statistics, Bull.* 88, and *Minnesota Experiment Station, Bull.* 124, 1911.

PECK, F. W., The Cost of Producing Minnesota Farm Products, 1908-1912. *Minnesota Experiment Station, Bull.* 145, 1915.

763—**Labour Requirements of Dairy Farms as Influenced by Milking Machines.**—HUMPHREY, H. N., in *U. S. Department of Agriculture, Bulletin* No. 423 (Professional Paper by the Office of Farm Management), pp. 1-18. Washington, November 25, 1916.

This bulletin gives the results of a series of studies on the organization of dairy farms, undertaken to determine the influence of the introduction of milking machines on the amount and distribution of labour on such farms.

The data were obtained from 109 New York dairy farms, 56 of which were using mechanical milkers, and from 160 farms in Ohio, Michigan and Illinois, 100 of which were using milking machines. Whereas, on the New York farms, dairy produce represented 90 % of the total business, on the other farms labour was largely devoted to general farming.

The principal facts obtained are as follows:

The time gained by mechanical milking increases with the number of dairy cows in the herd. In herds of 15 cows or less, the average time required to milk one cow by hand is more than 7 minutes, and the corresponding time by machine less than 5 minutes. In herds of more than 50 cows the average time for hand-milking is a little less than 7 minutes, for machine milking, 4.15 minutes. In herds of more than 50 cows one man can milk 28 cows by machine, whereas, by hand he can only milk 17.

The cost of hand milking changes but little with an increase in the herd, whereas that of machine milking decreases rapidly.

The average annual cost of milking a herd of 15 cows by hand is $10.91 per cow; in herds of 50 cows this cost is $10.45. In the first case mechanical milking costs $11.77, in the second, $7.34.

This does not mean that, in herds of less than 15 cows, mechanical milking is more expensive than hand milking. On 32 farms with less than 15 cows, machine milking allowed an annual economy of $2.63 per cow as the result of labour saved.

The appended table gives a summary of the labour employed on farms milking by hand and those milking by machine in the states of New York, Michigan, Ohio and Illinois. The total area and the labour devoted annually to crops (i.e. not including the meadows) are taken into consideration).

Farms without milking machines

State	Number of farms	Average size (acres)	Number of men employed per farm per acre	Acres of crops raised per farm	Acres of crops per man	Number of dairy cows per farm	Number of dairy cows per man
New York	53	191.4	2.16	73.8	34.2	30.8	14.3
Michigan, Ohio, Illinois	60	146.7	2.14	90.75	42.4	20.5	9.6
Farms with milking machines.							
New York	56	213.9	2.12	71.4	33.7	34.9	16.5
Michigan, Ohio, Illinois	100	166.4	2.22	98.3	44.3	23.7	10.7

The Michigan, Ohio and Illinois farms have a larger proportion of acreage under crops than many of the New York farms. They raise more crops per man employed and keep fewer dairy cows. From the point of view of the labour employed they are better organized than the New York dairy farms. Moreover, owing to the lack of good milkers and the high wages demanded, mechanical milking is of great importance on these farms.

764—The Theory of Correlation as Applied to Farm Survey Data on Fattening Baby Beef.—TOLLEY, H. R., in *U. S. Dept. of Agric., Bulletin* No. 504, Professional Paper; Office of Farm Management, pp. 1-14. Washington, May 23, 1917. (1 page in Institute Bulletin).

AGRICULTURAL INDUSTRIES

768—Home-Made Beet Syrup as a Substitute for Sugar.—TOWNSEND, D. C., and GORE, H. C., in *United States Department of Agriculture, Farmers' Bulletin* 823, pp. 13. Washington, May 1917

The authors describe a method for the manufacture of beet sugar (Patent No. 1,555,806 of October 5th, 1915).

The beets are carefully cleaned by soaking for a few minutes and then washing with a brush. A barrel is placed upright and the beets finely sliced with a sharp knife on the barrel, so that the slices fall inside. Boiling water is then immediately poured over the beets so that they are well covered. The barrel is then covered, wrapped in a cloth folded many times, and left for an hour; from time to time it is shaken without being uncovered. The liquid is then filtered through a cloth or run out through a tap in the cask. The filtered liquid is then evaporated over an open fire till it becomes syrupy. Thirty-five litres of beet give 70 litres of slices which are covered with 38 litres of boiling water. The slices are not crushed after maceration; as they still contain a little sugar they make an excellent food for poultry, pigs, etc. The scum which rises during heating must be carefully removed, by this means the syrup loses the disagreeable taste of the beets. The syrup, while still hot, is put into boxes or bottles, which are carefully closed up so as to prevent the formation of moulds.

769—Method of Bread-Making with Previously Soaked Grain.—LINDET, in *Comptes Rendus de l'Académie d'Agriculture de France*, No. 18, pp. 508-513. Paris, May 16, 1917.

The French Department of Agriculture nominated a special commission to study the method of bread-making tested at Bergamo (Italy) (1). The commission used good Australian wheat and medium La Plata wheat. Half of each wheat was ground, all the products mixed and worked in the usual way. The other two halves were heated by the Italian method, and all the bread cooked in the same oven. The bread made with soaked wheat and that made with ground wheat differed very slightly in appearance. As regards taste the results were as follows:

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(1) See also *Bulletin of Foreign Agricultural Intelligence*, November 1916, No. 679.

No. 1) Australian ground wheat: slightly unpleasant.

No. 2) Plata ground wheat: marked taste of bran making it slightly sour.

No. 3) Australian soaked wheat: sour.

No. 4) Plata soaked wheat: unpleasant.

Whole-meal bread made with ground grain is superior to whole-meal bread with soaked grain. This latter method can only be used with well-cleaned and well-washed wheat.

770—**Utilization of Rotten Potatoes in the Manufacture of Starch.**—I. Observations de M. DUCOMET.—II. Remarques de M. GIRARD, A., Ch. in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. 3, No. 26, pp. 716-719. Paris, July 11, 1917.

771—**Some Observations upon the Relation of Humidity to the Ripening and Storage of Fruits.**—SHAMEL, A. D., in *The Monthly Bulletin of the California State Commission of Horticulture*, Vol. VI, No. 2, pp. 39-41. Sacramento, California, February, 1917. (1 page in Institute Bulletin).

772—**Temperature Relations of Apple-Rot Fungi.**—BROOKS, C., and COOLEY, J. S., in the *Journal of Agricultural Research*, Vol. VIII, No. 4, pp. 139-163. Washington, D.C., January, 1917. (1 page in Institute Bulletin).

PLANT DISEASES

774—**Decree of the Italian Minister of Agriculture Regulating the Issue of Certificates of Immunity to Growers and Sellers of Plants or Portions of Plants.**—*Gazzetta ufficiale del Regno d'Italia*, Year 1917, No. 180, p. 3443. Rome, July 31, 1917.

775—**Factors Determining the Occurrence of "Silver-Leaf" on Trees.**—PETRI, L., in *Annali del R. Istituto sup. forestale nazionale*, Vol. II, 11 pp. Florence, 1917. (1 page in Institute Bulletin).

777—**On the Specific Susceptibility of Barley to Leaf Stripe Disease (Helminthosporium gramineum).**—KIESSLING, in *Zeitschrift fur Pflanzenzuchtung*, Vol. 5, Part 1, pp. 31-40. Berlin, March, 1917. (2 pp. in Institute Bulletin).

INJURIOUS INSECTS

781—**New Mites, mostly Economic (Arach. Acar.)**—BANKS, N., in *Entomological News*, Vol. 28, No. 5, pp. 193-199. Philadelphia, May, 1917.

782—**Relation between Climate and Life-Cycle of the Tussock Moth (Liparis monacha = Lymantria monacha)**—.SEDLACZEK, in *Oesterreichische Forst- und Jagdzeitung*, Year 34, No. 44, pp. 259-260. Vienna, 1916. (1 page in Institute Bulletin).

785—**Ceratomyza femoralis ("Wheat-sheath Miner"), a Dipterous Pest of Wheat.**—SEAMANS, H. L., in *Journal of Agricultural Research*, Vol. IX, No. 1, pp. 17-25. Washington, D.C., 1917. (1 page in Institute Bulletin).

787—**The Horse-Radish Flea-Beetle (Phyllotreta armoraciae Koch): its Life History and Distribution.**—CHITTENDEN, F. H., and HOWARD, NEALE F., in *United States Department of Agriculture Bulletin* 535, pp. 1-16. Washington, D.C., 1917.

788—**Notes on the Black Apple Leaf-Hopper (Idiocerus fitchi Van D.).** —BRITTAIN, W. H., and SAUNDERS, L. G., in *The Canadian Entomologist*, Vol. XLIX, No. 5, pp. 149-153. London, May 1917.

This insect was first described by Fitch as existing in New York State, but seems to occur generally in the North-eastern United States and Canada. It is also very common in the Annapolis Valley of Nova Scotia.

Contrary to the opinion generally held it has been proved experimentally that *Idiocerus fitchi* Van Duzee does not do serious damage to fruit trees, and that even a large number of these insects in an orchard does not justify the alarm sometimes caused by their appearance.

A description is given of the different life stages of the insect.

Fitch records this species as living on *Crataegus* and Osborne mentions it on *C. Oxyacantha* and on crab. In Nova Scotia it is very common on apple and pear trees in spring and early summer.

The eggs begin to hatch several days before the apple blossom petals open and continue for some time after their fall, that is to say, generally from the latter part of May to the beginning of June. The nymphal stage lasts from 7 to 8 weeks. Some days after emergence copulation takes place, and, shortly after this, the eggs are laid. By means of her beak the female makes a hole, usually in the fruit spur, or in a roughened surface on one of the smaller twigs, and deposits an egg therein. There is only one brood a year, the winter being spent in the egg stage.

A bibliography of 8 references is given.

AGRICULTURAL ECONOMICS

INTERIOR COLONIZATION IN CALIFORNIA

The legislature of California in 1915 passed a law providing for a commission to "investigate and consider the question of land colonization, and the various forms of land banks, co-operative credit unions and other rural credit systems adopted or proposed in this country or elsewhere, with especial view to the needs of the rural communities of this State".

Since 1910 questions of land tenure have assumed a hitherto unthought of importance in the United States. The causes for this are the disappearance of free, fertile lands, the rising prices of privately owned farm lands, the increase of tenant farming and the growing attractions of city life which lead young people to leave the farms.

The State of California has had no State land settlement policy but has left the matter entirely to unregulated private enterprise. There has been no public control of the selection of colonists, and no public scrutiny of the soil and conditions of purchase.

The task of the commission has been to study the methods and results of private colonization in California in recent years, and compare them with those found in other countries in which colonization is helped and directed by the State. The endeavour has been to get as much first-hand information as possible. Statements have been obtained from many settlers in nearly all parts of the State in which colonization has recently been active. Conferences with men active in matters of colonization and with interested commercial bodies have been held.

The results of the commission's investigations have been arranged in a report, published in 1916, which we will analyse in detail.

AGRICULTURAL CONDITIONS IN CALIFORNIA

California has an immense area of fertile and unpeopled land. Only eleven million out of the twenty-eight million acres of farm land are being cultivated. Nevertheless comparatively few settlers are immigrating and many who arrived in recent years have gone away. Costly advertising and still more costly personal solicitations have failed to attract colonists. The principal causes for this arrested development seem to be the high prices of land, the high rates of interest, and the short terms which colonization contracts allow for payment. Moreover great properties, owned by nonresidents, ought to be subdivided and cultivated by residents. 310 landed proprietors own more than four million acres of land suited to intensive cultivation and capable of supporting a dense population.

The enquiry obtained the following data as to the financial condition of settlers:

Number of settlers interviewed 991; average area of a farm 37 acres; average price paid for unimproved land $160 (minimum $56 and maximum $512); average time allowed for payment 5.8 years; average capital of settler $4,814; average cost of improvements $2,367 (minimum $850 and maximum $6.615); number of colonists still debtors 719; average amount of indebtedness $2,931; average rate of interest 8 per cent when money is furnished by a bank or privately, 6.9 per cent when it is furnished by contract.

In the whole of California the rate of interest on deferred payments for land and money borrowed to pay for land or its improvement or stocking varies from 6 to 10 per cent and the time allowed for repayment from three to eight years.

The following table shows the average price per acre in 1916 of farm land in the United States:

Geographical Division	Improved Lands	Unimproved Lands
North Atlantic States	$ 64.30	$ 38.71
South Atlantic States	38.02	23.79
North Central east of Mississippi River	100.67	74.95
North Central west of Mississippi River	78.21	59.68
South Central	33.38	24.09
Far West	102.58	58.40
California	180.00	110.00

As regards the prices paid by colonists in California for their lands these averaged according to their own statements $190.72 an acre, according to the statements of the commercial bodies in the State $260.97. an acre. The purchase price of unimproved land is, in fact, higher in California than in other parts of the United States or in countries which have a State system of land settlement.

The comparison of the price of land and conditions of land purchase in California with those obtaining elsewhere makes it seem wonderful that settlers in California pay for farms in from three to ten years while in other countries it takes them from thirty to seventy-five years to do so. The explanation is that in California the settler who has not had a large capital in cash or some outside income has not been able to buy a farm at all.

The experience of practically every colonizing company, no matter how successful, shows that it would have been better, both for the settlers and for the company, if the original enterprise had been organized on a basis which gave the settlers more money for improvements and a longer time in which to pay for their farms.

In the past men paid for land in California in five years: but the task of paying for a farm out of its products has become much harder in the last ten years. Thus when colonization began in Orland the price of land was from $10 to $40 an acre. The same land, unimproved, now sells for from $75 to $150 an acre and the water right costs an additional $40 an acre.

In fact, throughout the area of colonization the price of land has been multiplied by from two to ten, while the profits of farming have increased little if at all. Hence some years ago men who bought land at $50 an acre could pay high interest and also free themselves from debt, while those who have bought recently have to struggle even to pay interest.

The higher prices of land have made intensive cultivation necessary, and this entails costlier improvements and equipment. The investigation of the United States census showed that while the average area of a farm diminished between 1900 and 1910, the average capital invested in it increased by 86 per cent.

The average cost of improvement and equipment also increases as the size of the farm diminishes. Even if the cost of a house and stable on a twenty acre farm is no more than it used to be on a farm of 160 acres, its average cost per acre is about eight times as great.

The estimates made by the commercial organizations show that the ultimate cost of improvements on the small intensively cultivated farms averages $180 an acre.

The short time given in which to pay for land in most contracts of colonization implies a profit following on cultivation of between 20 and 25 per cent of the cost of land and equipment. Such profits are occasionally made but they are not the rule. Investigations of the United States Department of Agriculture shows that the fully improved farm rarely pays more than 5 per cent on the investment; if reasonable allowance be made for the wages of the farmer and his family.

The United States Reclamation Service has kept a careful census of the yield and value of crops grown under federal projects. It reports the following as the average values of crops: $31 an acre in 1910, $27 an acre in 1911, $26.60 an acre in 1912, and $24.50 in 1913. The reductions are mainly due to the declining prices of products, and prices for the last two years are higher. The total area cultivated under various projects, namely 1,364,149.9 acres (of which 703,424 were cultivated under government reclamation projects) was found to yield a crop worth, on an average. only $23.45 an acre.

In all districts exceptional single farms and single acres yielded far more than the average returns. For example single acres in Orland planted with citrus fruits have brought in $249 each, and single acres planted with small fruits $252 each. Single acres devoted to truck farming in Californian colonies have brought in more than $100 each. But plans for payment for colonists' farms should of course be based not on exceptional instances but on averages.

The United States census gave $43.50 an acre as the gross value of crops grown on irrigated land in California, but beginners cannot expect to reach this average because the calculation covered the highly improved orchards and vineyards in full bearing. Alfalfa crops, which are the beginner's main dependence, had an average value of only $22.94 an acre. Even in such industries as the growing of citrus fruits, which need a large investment in land, a long wait for returns, and exceptionally skilful and careful cultivation and marketing, the net profits over and above expenses of cultivation only average, according to a report prepared by the California Citrus Growers' Association, 4.3 per cent on land valued at $1,000 an acre.

Real estate agents from the overdone and less profitable fields of the Middle West flocked to California, not to develop agriculture but to exploit it. The prosperity of the settler was his own affair. The land agent's business was to make money out of him rather than to make money for him.

The underlying causes for much of the failure of the colonizing schemes are: 1) the selection of unfit land; 2) the selection of unfit settlers; 3) ignorance, on the part of the promoters, of proper colonizing methods, and, on that of the settlers, of the crops they should grow and how and when they should plant them; 4) the excessive cost of land; 5) the insufficient capital of the settler; 6) the excessive rates of interest on borrowed money and deferred payments; 7) the short terms allowed for payment; and 8) improper marketing facilities.

CONCLUSIONS AND RECOMMENDATIONS

After having made a detailed exposition of the position of agriculture in California, and having noticed all the disadvantages and abuses due to the complete liberty left to individuals as regards colonization, the commission advances, in the last part of its report, its conclusions and recommendations on which legislation should be based.

In the first place the commission considers that the State should have a land settlement policy and deal with this matter as a public problem.

In the greater part of the United States there has been little need for public supervision of rural development. The kind of crops which can be grown and the preliminary outlay they require are so restricted that little variation in methods is possible. It is otherwise in California. There much of the best land has to be irrigated, much has to be drained, and some has to be protected against floods. Every acre of irrigated land must have a right to water, and the character of such right is nearly as important as the validity of the title to the land. To prepare some areas properly for settlement involves an immense expenditure of money. It is practically impossible for an immigrant to protect himself against misrepresentation in these matters.

Water and climate, as well as soil, influence the value of agricultural land in much of California. Wherever irrigation is required plans for colonies should provide for the efficient use of streams. As the irrigated area extends and population increases, so does the demand for water increase and in like measure the struggle for its control. In great irrigable areas, like the San Joaquin and the Sacramento valleys, all agriculture will in time be bound together by a common dependence on the streams. For this reason the ultimate results will be more satisfactory if colonization is carried out in accordance with a carefully thought out plan embracing all the irrigable land in each watershed.

State supervision of colonization ought not to include ordinary sales of land among individuals but only enterprises, of sufficient magnitude to have public importance, which seek to attract settlers, unacquainted with local conditions, from a distance or from a particular neighbourhood. It should be the aim of such supervision to provide: 1) that adequate attention has been given to water supplies and drainage in irrigated areas; 2) that the land is suited to the purposes for which it is being sold; 3) that there is no misrepresentation in advertising. It should also aim at helping those engaged on colonization by pointing out to them features in their plan which are likely to lead to failure.

In the past settlers and land settlement have been helped by the large increase in the price of land which accompanied development. This made it possible to borrow money for improvements or to sell a part of the original purchase for nearly as much as it all cost at first. This aid must be replaced by a more generous system of personal credit and more efficient and cheaper methods of preparing farms for intensive cultivation.

The experience of other countries and of some American colonizing enterprises indicates that it is cheaper for an organization having ample capital to level and sow the land and finance the building of houses, rather than leave this work to the individual settler.

The commission makes the following suggestions as to the future financing of settlers in California:

1) They should have from twenty to thirty years in which to pay for their land;

2) After they have made the initial payment they should be required to pay nothing further on principal for the first two years, but the selling contract should stipulate the character of the improvements they must make;

3) The payment for land should be amortized; and the amount of annual or semiannual payments equal throughout the period of payment.

It also seems desirable that the State should establish one or more offices in which information as to approved colonizing enterprises could be obtained. California might, like West Virginia, distribute printed lists of land held by approved enterprises, stating the conditions of settlement and what crops might be grown on them.

The commission believed that over a considerable part of America the different States will soon have made colonization a public matter. In the east this will be done to lessen tenant farming and improve agricultural practices, in the west to settle unoccupied and uncultivated land rapidly. The tendency towards the adoption of this policy in the west is shown by the decision of the United States Reclamation Service to level and improve farms before offering them for settlement; by the introduction of and hearings on the Crosser Bill which, if enacted, will go far towards financing settlers on public lands; and by the report of the Co-operative Land Settlement Board in Wyoming, which has recommended that the federal government build irrigation works, and the State subdivide the land, select settlers, and finance their necessary improvements. It is understood that legislation to carry these recommendations into effect is being framed.

The immense area of land in the large estates of Cailfornia would make progress too slow if it depended entirely on action by the State; but the State can do much to promote the adoption of right policies by showing on a model colony the advantages of considering real agricultural development rather than local or immediate benefits. It is suggested that for this an area of about 10,000 acres be taken, from which there would have to be deducted approximately 300 acres for roads, canals, schoolhouses and recreation grounds, and 100 acres for farm labourers' allotments and a few small orchards and gardens. There would remain 9,600 acres or enough land to provide about two hundred farms varying in size from 20 to 100 acres. If these farms were all settled by alert, ambitious young men and women the advantage to agriculture in California would be great. The value of the demonstration would be increased if no settlers were admitted who were not experienced and trained, between eighteen and thirty years old, possessed of no farm land elsewhere in the State, and able themselves to reside on and cultivate their farms. The land should be paid for in thirty-six years, the initial cash payment being 5 per cent while interest at 4½ per cent, and amortized annual payments of 1½ per cent of principal should begin at the end of the fourth year, the settler paying for his land and having a clear title while he does so by paying 4½ per cent on the cost in the first four and 6 per cent in the remaining thirty-two years. Each settler should be required to have enough capital to pay in cash one fourth of the cost of all improvements made by the State, the payment of the other three fourths to be amortized and bear the same interest as payments for the land. It is believed that on these terms existing financial institutions can give whatever credit is necessary for buying stock, including dairy cows.

The selection of colonists should be entrusted to a board, and the subsequent management to a single competent superintendent reporting to this board. The State agricultural college should systematically provide information as to farming, and the superintendent should advise as to buying live stock and equipping farms. The State should, by contract, build houses, level land for irrigation, and lend money to settlers, within a fixed maximum limit, on insurable improvements carried out under the direction and to the satisfaction of the authorities in control.

The prices of farms, after subdivision, should be so adjusted that they pay for land lost on roads and canals, interest on the cost of the land between the time of subdivision and the time of settlement, and all other incidental expenses.

The selection of the land should be entrusted to an expert committee who would buy it at its productive value. This policy would, if it were understood, be a guarantee to settlers that they were getting their money's worth. The land might be paid for with State bonds bearing interest at the rate of perhaps 4 per cent, or it might be bought under a contract by which the landowner gave deeds to the settler directly, the State guaranteeing his payments and having the right to complete the purchase and enter into full ownership at any time deemed advisable. Existing State authorities could plan the works for a water supply, subdivide the area and fix the size of farms. The amount of capital to be provided for financing the settlers could be greatly reduced by making full use of the possibilities of loans under the Federal Farm Loan Act.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the September number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original Bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted:

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THE WORLD'S LIVE STOCK AND THE WAR

BY T. K. DOHERTY, LL.B.

The purpose of this article is to investigate the numbers of live stock in the world over a period immediately before the war and compare them with the numbers ascertained in years nearest to the present. The data necessary for such an enquiry are not at all complete; in many countries the numbers of live stock are not ascertained annually, as they are in Canada and the United States, but only in census years, so the data available do not coincide with the period under consideration. Not only is recent information not at hand for Germany and her Allies, but for some of the Entente Allies, such, for instance, as Italy, and India, and for Argentina, the chief exporting neutral. However, from the presentation in the following tables "A" and "B," of such details as are available, a useful comparison may be made between certain groups of countries and a more general survey made of others. The data for Italy and Argentina, and a few other less important countries, although for years that do not permit of proper comparison, are, for the purpose of illustration, placed alongside of comparable data. The latter alone, however, figure in the group totals.

In so far as possible the grouping has been made to show separately our allied countries which are importers (Group I), the neutrals which are importers (Group II), the Allies and neutrals which are exporters (Group III), and miscellaneous other countries which have furnished the Institute incomplete reports and for years that make comparison difficult (Group IV).

In table "A," for each country separately the differences between the earlier and later years mentioned have been established to show either an increase or a decrease in the number of live stock as the case may be. Increases are indicated by a plus sign and decreases by a minus sign.

In table "B" the totals of the first three groups are similarly compared and the differences stated, so that some general idea may be formed as to whether the European demand can be met from the Overseas supplies that appear available.

TABLE A

COUNTRIES	Date of Enumeration	Horses	Milch Cows	Other Cattle	Sheep	Pigs
Group I:—						
Great Britain	June 5, 1916	2,108,445	4,499,321	7,952,219	28,849,655	3,615,891
& Ireland	June 4, 1914	1,915,533	4,576,852	7,567,711	27,886,095	3,939,887
		(+ 192,912)	(— 77,531)	(+ 384,508)	(+ 963,560)	(— 323,996)
France	July 1, 1917	2,282,560	6,238,690	6,204,614	10,586,594	4,200,280
	July 1, 1916	2,281,415	6,337,799	6,386,147	12,079,211	4,448,366
	Dec. 31, 1913	3,222,080	7,794,270	6,993,440	16,131,390	7,035,850
		(— 939,520)	(—1,555,580)	(— 788,826)	(—5,544,796)	(—2,835,570)
Italy	March, 1914	....	....	6,646,000(a)	13,824,000	2,722,000
	1908	955,878	....	6,198,861(a)	11,162,926	2,507,798
				(+ 447,139)	(+2,661,074)	(+ 214,202)
Group II:—						
Spain	Dec. 31, 1916	488,715	....	3,070,903(a)	16,012,277	2,814,465
	Dec. 31, 1912	525,853	....	2,561,894(a)	15,829,954	2,571,359
		(— 37,138)		(+ 509,009)	(+ 182,323)	(+ 243,106)
Denmark	July 12, 1917	572,412	1,147,183	1,310,975	480,007	1,650,623
	Feb. 20, 1917	538,395	1,140,649	1,312,204	267,979	1,980,727
	July 15, 1914	567,240	1,310,268	1,152,594	514,918	2,496,706
		(+ 5,172)	(— 163,085)	(+ 158,381)	(— 34,911)	(— 846,083)
Switzerland	Apr. 19, 1916	136,613	848,652	766,993	171,635	544,021
	Apr. 21, 1911	144,128	796,909	646,574	161,414	570,226
		(— 7,515)	(+ 51,743)	(+ 120,419)	(+ 10,221)	(— 26,205)
Netherlands	Apr. 1917	....	1,234,375	1,066,632	520,810	1,185,565
	June, 1913	....	1,109,679	986,920	842,018	1,350 204
			(+ 124,696)	(+ 79,712)	(— 321,208)	(— 164,639)
Norway	Sept., 1916	189,175	....	1,119,306(a)	1,281,030	221,217
	Sept., 1915	186,217	....	1,120,517(a)	1,329,559	208,552
	Sept., 1910	167,714	....	1,133,613(a)	1,398,383	333,709
		(+ 21,461)		(— 14,307)	(— 117,353)	(— 112,492)
Sweden	June 1, 1916	701,099	1,769,689	1,143,470	1,198,469	1,065,396
	Dec. 31, 1913	596,188	1,843,074	879,572	972,394	977,612
		(+ 104,911)	(— 73,385)	(+ 263,898)	(+ 226,075)	(+ 87,784)
Group III:—						
Canada	June 30, 1917	3,412,749	3,202,283	4,718,657	2,369,358	3,619,382
	June 30, 1916	3,258,342	2,833,433	3,760,718	2,022,941	3,474,840
	June 30, 1914	2,947,738	2,673,286	3,363,531	2,058,045	3,434,261
		(+ 465,011)	(+ 528,997)	(+1,355,126)	(+ 311,313)	(+ 185,121)

TABLE A

COUNTRIES	Date of Enumeration	Horses	Milch Cows	Other Cattle	Sheep	Pigs
United States	Jan. 1, 1917	21,126,000	22,768,000	40,849,000	48,483,000	67,453,000
	Jan. 1, 1916	21,159,000	22,908,000	39,812,000	48,625,000	67,766,000
	Jan. 1, 1914	20,962,000	20,737,000	35,855,000	49,719,000	58,933,000
		(+ 164,000)	(+2,031,000)	(+4,994,000)	(—1,236,000)	(+8,520,000)
New Zealand	Jan. 31, 1917	367,167	760,108	1,742,592	24,753,324	278,156
	Apr. 1, 1911	404,284	804,078	1,216,093	23,996,126	378,754
		(— 37,117)	(— 43,970)	(+ 526,499)	(+ 757,198)	(— 100,598)
South Africa	 1913	....	....	....	35,710,843	....
	 1911	714,414	....	5,796,949(a)	33,473,410	....
					(+2,237,433)	
Argentina	Dec. 31, 1913	9,366,455	....	30,796,447(a)	81,485,149	3,197,337
	Census, 1908	7,537,314	....	29,124,336(a)	67,383,962	1,404,269
		(+1,829,141)		(+1,672,111)	(+14,101,187)	(+1,793,068)
Australia	 1915	2,378,514	....	9,931,345(a)	69,244,603	752,961
	 1913	2,251,983	....	11,483,882(a)	85,057,402	800,505
	 1900	1,609,654	....	8,640,225(a)	70,602,995	950,349
		(+ 126,531)		(—1,552,537)	(—15,812,799)	(— 47,544)
Brazil	 1916	6,065,230	....	28,962,180(a)	7,204,920	17,329,210
	 1912	7,289,690	....	30,705,400(a)	10,549,930	18,400,530
		(—1,224,460)		(—1,743,220)	(—3,345,010)	(—1,071,320)
Uruguay	 1916	....	....	7,702,442(a)	11,482,251	....
	 1908	....	....	8,192,602(a)	26,286,296	180,099
				(— 490,160)	(—14,804,045)	
Group IV:—						
British India	.... 1914 1915	1,653,379	37,481,273	48,644,710	23,015,836	....
	.... 1912 1913	1,554,830	35,711,694	47,022,902	22,934,265	....
		(+ 98,549)	(+1,769,579)	(+1,641,808)	(+ 81,571)	
Chili	.... 1915 1916	442,642	....	1,869,053(a)	4,557,800	258,025
	.... 1913 1914	457,845	....	1,968,620(a)	4,602,317	221,384
		(— 15,203)		(— 99,567)	(— 44,517)	(+ 36,641)
Tunis	Apr. 30, 1916	30,963	86,376	153,613	1,147,910	10,252
	Dec. 30, 1913	37,416	....	217,304(a)	728,540	17,399
		(— 6,453)		(— 63,691)	(+ 419,370)	(— 7,147)
Egypt	 1916	34,403	....	492,650(a)	687,696	8,580
	 1913	47,911	....	637,098(a)	....	....
		(— 13,508)		(— 144,448)		
Russia-in-Europe	 1916	23,007,539	....	37,562,954(a)	59,950,742	16,299,508
(47 governments)	 1914	20,600,608	....	28,926,122(a)	37,691,318	12,132,524
		(+2,406,931)		(+8,636,832)	(+22,259,424)	(+4,166,984)
Germany	Dec. 1, 1915	3,341,627	10,970,009	9,376,939	5,073,478	17,287,211
	Dec. 2, 1912	4,523,059	10,944,283	9,237,738	5,803,446	21,923,707
		(—1,181,432)	(+ 25,726)	(+ 139,201)	(— 729,968)	(— 4,636,496)

(a) All cattle.

TABLE B

COUNTRIES	Date	Total Horses	Total Cattle	Total Sheep	Total Pigs
1st Group:— Great Britain & Ireland, and France	Latest date	4,391,005	24,894,844	39,436,249	7,816,171
	Pre-war	5,137,613	26,932,273	44,017,485	10,975,737
		(— 746,608)	(—2,037,429)	(— 4,581,236)	(—3,159,566)
2nd Group:— Spain, Denmark, Switzerland, Netherlands, Norway, and Sweden	Latest date	2,088,014(a)	13,478,178	19,664,228	7,481,287
	Pre-war	2,001,123(a)	12,421,097	19,719,081	8,299,816
		(+ 86,891)	(+1,057,081)	(— 54,853)	(— 818,529)
3rd Group:— Canada, United States, New Zealand, Australia, Brazil, Uruguay	Latest date	33,349,660(b)	120,636,607	163,537,456	89,432,709(b)
	Pre-war	33,213,366(b)	115,030,872	197,666,799	81,947,050(b)
		(+ 136,294)	(+5,605,735)	(—34,129,343)	(+7,485,659)
Totals, above countries	Latest date	39,828,679	159,009,629	222,637,933	104,730,167
	Pre-war	40,352,102	154,384,242	261,403,365	101,222,603
		(— 523,423)	(+4,625,387)	(—38,765,432)	(+3,507,564)
Totals of all countries mentioned in Table "A" including Italy, South Africa, Argentina, and the countries in Group IV. with the exception of Russia-in-Europe	Latest date	54,698,148(c)	305,526,699(d)	387,452,949	128,204,992
	Pre-war	56,180,769	301,244,027	407,492,231	126,997,160
		(—1,482,621)	(+4,282,672)	(—20,039,282)	(+1,207,822)

(a) Less Netherlands. (b) Less Uruguay. (c) Less Italy, and South Africa. (d) Less South Africa.

NOTES ON THE PRECEDING TABLES

GROUP I.—*Great Britain.*—The increase of "all cattle" is 306,977, resulting from an increase of 384,508 cattle and a decrease of 77,531 cows. The increase in sheep compensates for the decrease in swine.

France.—All cattle show a decrease of 2,344,406. Note that the decrease occurs every year in all classes of stock except horses, which remain unchanged during the last two years. There is a decrease of 29% in horses; 20% in milch cows; over 11% in other cattle; nearly 34½% in sheep; and 40% in pigs.

Italy.—Data not comparable owing to census dates. General condition parallel those of France to such an extent that an equally serious depletion of stock might be inferred. Assuming for Italy decreases of stock since 1914 equivalent to one-half the percentage of the decreases recorded for France, we have, instead of the increases shown for Italy in table "A," really decreases of 95,587 horses, 398,660 cattle, 2,350,000 sheep, and 544,400 swine.

Leaving Italy out of consideration, and including only Great Britain and France in Group I, it is seen from table "B" that the decreases of cattle, sheep and swine aggregate 9,778,831 head.

GROUP II.—*Neutrals.*—Note that increases appear in all classes of stock in Spain and Sweden. Netherlands has done well in cattle, and Switzerland in cattle and sheep, but both have fallen behind in other lines. Taking Group II as a whole (table "B"), the decrease in swine, 818,529, is more than accounted for by the decrease for Denmark alone, of 846,083 head

GROUP III.—*Exporting Countries.*—The North American section of this group shows generally substantial increases, except for a decrease of 1,236,000 in sheep in the United States.

With regard to the increase of 8,520,000 swine in the United States from 1914 to 1917, it should be noticed that 5,685,000 of this increase occurred between 1914 and 1915, the increase between 1915 and 1917 being only 2,835,000. For Canada and United States there are increases of 2,035,000 cows, 5,137,000 "other cattle," totalling 7,172,123 in "all cattle."

The increases reported for nearly all classes of stock are considerable, and that is evidence that "Greater Production" campaigns have been effective in producing results. It should be noted, however, that for Canada the data for 1917 are not strictly comparable with those for 1914. In 1917 the estimates for the provinces of Quebec, Saskatchewan, Alberta, and British Columbia are based on returns from individual farmers. For 1916 the estimates of the three Prairie Provinces are those of the census of 1916. That there are really increases, however, especially in the number of cattle, cannot be doubted.

In view of the increased production of live stock in these two countries, it is interesting to observe that the exports of live stock and live stock products have increased to a marked extent, as the following table shows:—

EXPORTS OF ANIMAL PRODUCTS FROM CANADA AND THE UNITED STATES

CANADA	1916-17	1915-16	1913-14
Lard	1,405,633	24,998	125,619
Bacon	207,213,267	144,918,867	23,859,754
Beef	45,546,176	47,422,564	13,133,205
Hams	4,403,244	8,732,857	1,890,182
Mutton	167,993	99,593	65,167
Pork	13,987,460	13,142,169	1,811,204
Canned meats	6,676,094	11,031,893	638,583
Total	279,399,867	225,372,941	41,523,714

Year ending March 31st.

UNITED STATES	1916-17	1915-16	1913-14
Fresh beef	197,181,101	231,214,000	6,394,404
Canned beef	67,576,725	50,803,700	3,464,733
Pickled and other cured beef	58,693,667	38,114,600	23,265,974
Bacon	667,156,061	579,808,700	193,964,252
Hams and shoulders	266,655,581	282,208,600	165,881,791
Lard	444,787,521	427,011,300	481,457,792
Total	1,702,050,656	1,609,160,900	874,428,946

Year ending June 30th.

New Zealand does well in cattle and sheep, but exhibits decreases in horses and swine to the extent of 37,117 and 100,598 respectively.

The southern division of this export group shows results that are decidedly unfavourable, due undoubtedly to the droughty conditions prevalent in the latest year for which each country reports. New Zealand, to which we have just referred, was doubtless as badly affected in 1915 as Australia, but had recovered by 1917, the year to which the above report refers. On the other hand the latest reports to hand for Australia (1915), Brazil, Uruguay and Chili (1916), coincide with years when the destruction of all crops was exceptionally severe. It would not be unreasonable to assume that by this time the stock in these countries would, in consequence of better crop conditions since, be in good part replenished, or on the way to replenishment.

Argentina's census report, as taken last summer, will not be available before February. Only pre-war figures are now available. Data, if available as referring to 1916, would probably have shown a marked decrease as compared with those for 1913. Now we learn that South America is reaping record harvests, and we can infer that there will be a rapid replenishment of her depleted live stock.

From these observations it may be doubted whether the details in Group III reflect the real present conditions, and whether the totals in table "B" can be relied upon as even approximately correct.

GROUP IV.—The results in India, although not recent, are uniformly favourable, there being an increase of 3,411,387 head in all classes of cattle, 98,549 in horses, and 81,571 in sheep. Crops have since been good, and probably the progress in live stock has been well maintained.

Except for the increase in Chili of 36,741 pigs, and in Tunis of 419,370 sheep, these two countries, as well as Egypt, show general decreases.

Russia.—The big increases in Russia recorded in 1916 followed two seasons which had yielded large crops. The comparative failure of crops of 1916 and 1917 might enable us to infer that she must by this time be incurring a serious depletion in live stock. Then the official figures given in table "A" show such large increases, especially for sheep and cattle, as to create a suspicion that they are exaggerated. In dealing, therefore, with aggregate figures, at the end of table B. those for Russia have been omitted.

Germany.—The report for 1915, the last official one, indicates that even so early in the war, decreases in pigs, horses and sheep were quite marked. With smaller crops since that year, and from other knowledge that has leaked through, it is probable the present depletion of stock is extermely serious. As much can be inferred concerning Austria Hungary, whence no report has issued since the war.

INTERNATIONAL INSTITUTE CROP CABLE, JAN. 30th

A cablegram received from the International Institute of Agriculture gives the following crop data:—

Production of wheat in Uruguay, 18,372,000 bushels, or 340.8 per cent of the 1916-17 crop, an increase of 12,980,000 and 273.6 per cent of the five years' average 1911-12 to 1915-16, an increase of 11,660,000; in Union of South Africa, 8,833,000 bushels, 184.4 per cent of last year, an increase of 4,050,000, and 135.5 per cent of the five years' average, an increase of 2,320,000; in New Zealand, 8,000,000 bushels, 160 per cent of last year, an increase of 3,000,000, and 125 per cent of the five years' average, an increase of 1,600,000.

Production of oats in New Zealand, 21,138,000 bushels, 337 per cent of last year, an increase of 14,870,000, and 137 per cent of the five years' average, an increase of 5,710,000.

In England and Wales the area sown to wheat shows an increase of 15 per cent and rye 3 per cent. The area sown to barley and oats is practically the same as last year.

The total production of cotton in United States, India, and Egypt is 15,355,000 bales of 500 pounds, or 94.5 per cent of last year and 81.7 per cent of the five years'average.

Total production of wine in Spain, France, Luxemburg, and Algeria is 1,448,209,000 imperial gallons, or 100.3 per cent of last year, and 96.4 per cent of the five years' average.

CANADIAN CROPS OF 1917

The final estimates of the cereal crops of Canada are as follows: Wheat, 233,742,850 bushels, compared with 262,781,000 in 1916; oats, 403,010,000 bushels, compared with 410,211,000; barley, 55,057,750, compared with 42,770,000; rye, 3,857,200, compared with 2,876,400; flaxseed, 5,934,900, compared with 8,259,800; corn, 7,762,700, compared with 6,282,000.

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The Live Stock Branch..........Commissioner, H. S. Arkell, M.A., B.S.A.

Encourages and assists the development of the live stock industry.

The Health of Animals Branch....Veterinary Director General, Frederick Torrance, B.A., D.V.S.

Administers the Animals Contagious Diseases Act and the Meat and Canned Food Act. Protects Canadian live stock from contagious diseases.

Entomological Branch...Dominion Entomologist, C. Gordon Hewitt, D.Sc.

Conducts investigations on insects in relation to agriculture, encourages the use of methods of prevention and control and administers the Insects and Pests Section of the Destructive Insect and Pest Act.

The Fruit Branch........................Commissioner, Donald Johnson.

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